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ABSTRACT

In keeping with its priority to reduce the disproportionate burden of heart, lung, and blood diseases in minority populations, the National Heart, Lung, and Blood Institute has established an outreach project called Building Healthy Hearts for American Indians and Alaska Natives. This background report provides an overview of the cardiovascular health status of this population to guide development of the project. Section 1 discusses the limitations of data on the health of Native people. The second section presents demographic characteristics of Native Americans. Section 3 discusses cardiovascular disease mortality, major cardiovascular risk factors, and effects of these risk factors on Native people. The fourth section describes health knowledge, beliefs, and behaviors of Native Americans including their perceptions of health. Section 5 highlights several existing community-based health promotion and disease prevention programs targeted at Native Americans. The sixth section presents recommended strategies for designing community-based health promotion programs for Native Americans based on the success of existing programs. Section 7 discusses five theoretical models of health promotion programs targeting Native people. The final section offers recommendations for improving the heart health of Native Americans based on existing literature, evaluations of current programs, and telephone interviews with people working to improve Native health. (Contains 60 references.) (TD)

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BUILDING HEALTHY HEARTS FOR AMERICAN INDIANS AND ALASKA NATIVES:

A BACKGROUND REPORT

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The logo for the Building Healthy Hearts for American Indians and Alaska Natives Initiative depicts the drum as a focal point in tribal traditional life. The drum is a living thing to be treated with deep respect, and the act of drumming is connected to the heartbeat. The shape of the drum represents the circle of life, reminding us that we are all linked with one another. The drumsticks symbolize the four directions, which in turn are associated with the four stages of life: east, the newborn; south, the adolescent; west, the adult; and north, the elder. The four directions are also tied to four colors. east represents the early morning white light (often shown as white corn, symbolizing the male and father of the family), south the blue sky of noon, west the yellow of sunset (often shown as yellow corn, symbolizing the female and mother of the family), and north the black of night.

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The NHLBI anniversary logo represents 50 years of success; people doing science to improve the health of people.

BUILDING HEALTHY HEARTS FOR AMERICAN INDIANS AND ALASKA NATIVES:

A RESEARCH REPORT

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Foreword

As we embark upon the new millennium of helping people improve their health through research, research training, and education activities, the National Heart, Lung, and Blood Institute (NHLBI) is committed to eliminating disparities in health status particularly among minority communities. Since 1972, The NHLBI has translated and disseminated knowledge to the community to promote public health and prevent and control heart, lung, and blood diseases and sleep disorders. Through its national education programs and Initiatives, the NHLBI seeks to increase public awareness and professional practice, set policy agendas, and generally improve the quality of life for all Americans. These programs include the National High Blood Pressure Education Program, the National Cholesterol Education Program, the National Heart Attack Alert Program, the National Asthma Education and Prevention Program, the NHLBI Obesity Education Initiative, and the National Center on Sleep Disorders Research.

Cardiovascular disease (CVD) is the leading cause of death for all Americans, including American Indians and Alaska Natives (AI/AN). More AI/AN men and women over age 45 die from CVD than any other disease. CVD is the second leading medical cause of death after cirrhosis for Indian men and women ages 15-44. However, it is a relatively recent phenomenon among native populations. The prevalence of CVD has increased as more people adopt Western lifestyles characterized by high-fat, high-calorie diets and low levels of physical activity. Complicating efforts to combat risk factors is the lack of access many Native Americans have to clinical preventive services and health education.

Through research and clinical studies we have determined that many of the risk factors that influence the prevalence and severity of CVD can be reduced by lifestyle changes. These risk factors include high blood pressure, high blood cholesterol, cigarette smoking, physical inactivity, obesity, and diabetes. Today, AI/AN struggle with the health burden of CVD and its associated risk factors. For example, diabetes has risen to epidemic proportions in some communities, and many other communities are fighting the battle against obesity and high blood pressure.

Although significant improvements have been made in the Nation's overall health, the gains are not equally shared by ethnic and racial minorities. By virtually every health status indicator--life expectancy, mortality, morbidity, use of and access to health resources--minorities fare poorly. These groups continue to suffer more acutely from disability and disease, and they share a disproportionate burden compared with the general population. The Institute's priority is to determine better methods to reduce the disproportionate burden of heart, lung, and blood disease and sleep disorders in minority populations.

This challenging quandary has led the NHLBI to establish an outreach project called Building Healthy Hearts for American Indian and Alaska Natives. This project seeks to promote healthy lifestyles and reduce the prevalence of CVD and its associated risk factors by developing and implementing CVD prevention and control strategies designed specifically for AI/AN.

The Institute thanks all those who have contributed to this background report which provides an overview of the cardiovascular health status of AI/AN. This report will serve as a blueprint in the development of the project. The success depends on the involvement of all communities--this support has been given enthusiastically. Together, we will continue to strengthen the heart beat of this generation and generations to come.

C. Lenfant

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INTRODUCTION

The American Indian and Alaska Native population is the smallest self-identified, racial-ethnic group in the United States, numbering about 2 million people. They are widely dispersed across the Nation, belonging to more than 547 tribes and speaking more than 200 distinct languages. As a population, American Indians and Alaska Natives generally are younger, have less education, and tend to be poorer than other populations in the United States. Many are employed in agriculture, craft, and repair service occupations; few work in managerial and professional specialty occupations. In this report, "native" and "native people" are used to refer to both American Indians and Alaska Natives.

Cardiovascular disease (CVD) is the leading cause of death for all Americans, including American Indians and Alaska Natives. More men and women over 45 years old die from CVD than any other disease. CVD is a relatively recent phenomenon in the American Indian and Alaska Native population. As more native people adopt Western lifestyles characterized by a high-fat, high-calorie diet and low levels of physical activity, the prevalence of CVD increased in many native communities.

Today, American Indians and Alaska Natives struggle with the health burden of CVD and its associated risk factors. Diabetes has risen to epidemic proportions in some populations, and many others are fighting the battle against obesity and high blood pressure. Because native people generally earn less than the average American and tend to live in remote, rural locations, some may have limited access to clinical preventive services, health education, and prevention efforts. All these factors act synergistically to place native people at very high risk for chronic diseases.

In 1990-92, CVD accounted for proportionally more deaths among American Indian and Alaska Natives age 45 to 64 than among people of the same age group in the general population. As this population ages, the absolute number of elderly and chronically ill people in this group is likely to increase.

Because of the diversity of this population, health promotion efforts to improve the health status of American Indians and Alaska Natives should be tailored to the needs of specific target communities. Native people are characterized not by their homogeneity, but rather by their heterogeneity. Tribes differ markedly in their health and disease patterns and behaviors as well as in the sociocultural aspects of their lives. For example, whereas heart disease accounted for 15.9 percent of all deaths in 1990-92 in the Tucson area, it accounted for 32.4 percent of total deaths in Oklahoma (Indian Health Service, 1996).

Although manifestations of health and disease patterns and societal norms vary, American Indians and Alaska Natives share a number of cultural values that can be effectively incorporated into health promotion activities.

Organizing community-based programs at the local level and involving community members in all phases of program design, implementation, and evaluation will ensure that programs are culturally sensitive, relevant, and appropriate.

This report attempts to provide a comprehensive picture of CVD in the American Indian and Alaska Native population. It is organized into eight sections.

- **Limitations of the Data**. This section discusses the limitations of the data available on the health status of Native people.
- **Sociodemographics of American Indians and Alaska Natives.** This section presents the demographic characteristics of native people in the United States. These attributes include population density, composition and geographic distribution, age, education, income and employment, and access to health care.
- **Cardiovascular Disease Among American Indians and Alaska Natives.** This section discusses CVD mortality and provides information on each of the major cardiovascular risk factors—high blood cholesterol, high blood pressure, cigarette smoking, physical inactivity, diabetes mellitus, obesity. This section also discusses the dietary and alcohol consumption practices and the effects of these risk factors on native people.
- **Native Culture and Perceptions of Health.** This section describes the knowledge, beliefs, and behaviors of American Indians and Alaska Natives as well as their perceptions of health. Specific topics include social structure, concept of time, harmony with the environment, oral communication, and traditional and contemporary methods of healing.
- **Community-Based Health Promotion and Disease Prevention Programs for American Indians and Alaska Natives.** This section highlights several existing prevention and intervention programs targeted to native communities.
- **Recommended Strategies for Effective Programs.** This section presents recommended strategies for designing community-based health promotion programs for American Indians and Alaska Natives, based on the success of existing programs. Discussions with program planners and other influential people who work directly with this population offer insight into various strategies.
- **Theoretical Models.** This section discusses five theoretical models that can be incorporated into the development of health promotion programs targeting native people.
- **Needs and Opportunities.** This section offers recommendations for transforming needs in health promotion and disease prevention and control programs into opportunities to improve the heart health of American Indians and Alaska Natives. The recommendations are based on the existing epidemiological literature, evaluations of current health promotion and disease prevention programs, and telephone interviews with people working to improve native health. The recommendations provide a framework on which to build effective health programs that increase the awareness of cardiovascular risk factors and their impact on heart health in native communities.

Limitations of the Data

A paucity of data exists on the health status of American Indians and Alaska Natives. The lack of adequate representation of this population in national surveys and databases leaves researchers and program planners to rely almost exclusively on studies that focus on specific regions and tribes. The heterogeneity that characterizes native tribes, however, limits generalizations to all native peoples based on data on a particular tribe. Researchers must be aware of these and other limitations to the data. This section briefly highlights the boundaries that exist in making conclusions based on the data on native people.

U.S. Census Data

Historically, American Indians and Alaska Natives have not been well represented in national surveys. Only recently has the U.S. Bureau of the Census included American Indians living in the Indian Territory and on reservations in population counts. In an attempt to include all native people in the census, the Census Bureau established liaisons with more than 300 tribal governments. Unfortunately, many households on American Indian reservations and in Alaska Native villages were still excluded. In addition, many native people did not participate in the census due to their migration patterns between rural and urban areas or in protest to the U.S. Government's treatment of indigenous peoples. The 1980 census estimated that racial minorities were undercounted by approximately 6 percent. The estimated undercount of minorities in the 1990 census was at least as high (National Cancer Institute, 1993).

National Health Surveys

In the health arena, the types of data available for U.S. whites and African Americans are unavailable for American Indians and Alaska Natives. Native people have not been oversampled in most health and nutrition surveys, particularly the National Health and Nutrition Examination Surveys (NHANES). The few existing studies on the health of American Indians and Alaska Natives generally have been conducted in specific geographic regions and among different tribes. Given the wide variation in biological, sociodemographic, and sociocultural characteristics among this population, as well as the lack of sufficient total numbers to provide generalizable and accurate aggregate data, caution must be taken not to generalize specific data to all native people in the United States.

Mortality Data and Surveys

Other factors limiting the accuracy of available data on native people include racial misclassification, blood quantum (percentage of American Indian or Alaska Native heritage), and tribal enrollment. For mortality data, States submit death certificates to the National Center for Health Statistics for inclusion in

national mortality analyses. Unfortunately, people completing an individual's death information may assume the decedent's race by visual observation and without verification. This racial misclassification can lead to misinformation in the State and national databases, resulting in potentially erroneous conclusions.

Hahn and colleagues examined racial classification from birth and death certificates from 1983 to 1985 for American Indian and Alaska Native infants in 33 reservation states. They concluded that misclassification of race on birth and death certificates tended to occur about 50 percent of the time (National Cancer Institute, 1993). Race and ethnicity questions on surveys also pose a classification problem. The number of people identifying themselves as American Indian or Alaska Native depends on whether the survey allows identification through ancestry, blood quantum, or tribal enrollment.

Indian Health Service

The Indian Health Service (IHS) databases reflect only a segment of the entire American Indian and Alaska Native population. The IHS provides health services to all American Indian and Alaska Native persons residing in IHS service areas. Only native people who have used IHS services within the last 3 years are included in the "user population" that is calculated by the IHS. Health information on people who have never used IHS facilities and people who use private practitioners and Veterans Administration facilities is not included in the IHS database.

In addition, data on native people who live in urban areas and obtain their health care from sources within the city are not usually provided to the IHS for inclusion in its database (National Cancer Institute, 1993). Data reporting may be further hampered in the future as American Indian tribes begin to assume more responsibility for their own health service delivery and health services for American Indians and Alaska Natives as a whole population become less cohesive.

Differences in Data Collection

Inconsistencies in data collection protocols among existing studies limit the ability to compare data accurately. Many studies do not follow a standard definition of risk factors. For example, obesity has been variably defined, and low- and high-density lipoprotein cholesterol values may or may not be included in the analysis or definition of hypercholesterolemia. In addition, measurement of risk factors differs substantially among studies.

In testing for diabetes, some studies do not distinguish between insulin-dependent diabetes mellitus and non-insulin-dependent diabetes mellitus and they do not use glucose tolerance testing to screen for undiagnosed diabetes cases. Risk factors like physical inactivity, and cigarette smoking are also difficult to quantify or standardize. Furthermore, studies differ in their age standardization methods, making valid comparisons difficult (Ellis and Campos-Outcalt, 1994). Standardization of methodology and analysis of risk factors in future studies would facilitate comparison between groups.

Sociodemographics of American Indians and Alaska Natives

Definition of American Indian and Alaska Native

The Bureau of the Census uses self-identification to classify persons as American Indians or Alaska Natives and to identify tribal membership. The Census Bureau's definition of American Indian or Alaska Native is "a person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliations or community recognition." Blood quantum, which indicates the percentage of American Indian or Alaska Native heritage, is not always a clear indication of American Indian or Alaska Native status. Persons who have one-sixteenth of native blood may mark American Indian or Alaska Native on the census although they may live a mainstream lifestyle. It should be noted, however, that persons identifying themselves as American Indian or Alaska Native may not necessarily have one-sixteenth blood quantum.

Population Density

American Indians and Alaska Natives total about 2 million people in the United States. This population comprises the smallest self-identified racial group in the United States, less than 1 percent of the U.S. population. Between 1980 and 1990, the number of people who identified themselves as American Indians or Alaska Natives increased by 38 percent. The increase during this period was due not only to natural causes, but also to changes in people's self-identification from other races to American Indian or Alaska Native. In addition, improvements were made in methodology for counting people who live on reservations, on trust lands, and in Alaska Native villages (U.S. Bureau of the Census, 1993). Projections estimate that the American Indian population will reach 4.6 million by the year 2050.

The Bureau of Indian Affairs currently recognizes more than 547 tribes of native people in the United States (Indian Health Service, 1995a). Members of these tribes speak more than 200 distinct languages and are widely dispersed across the United States.

Ten Largest American Indian Tribes

Tribe	Population
Cherokee	369,035
Navajo	225,298
Chippewa	107,321
Sioux	105,988
Choctaw	86,231
Pueblo	55,330
Apache	53,330
Iroquois	52,557
Lumbee	50,888
Creek	45,872

Source: U.S. Bureau of the Census, 1990

Composition and Geographic Distribution

In the 1990 census, American Indians comprised about 96 percent of the entire native population. About 19 percent identified themselves as Cherokee, 12 percent as Navajo, 6 percent each as Chippewa and Sioux, and 5 percent as Choctaw. The next five largest tribes were Pueblo, Apache, Iroquois, Lumbee, and Creek. Most tribes had fewer than 10,000 members in 1990.

Native people were the first inhabitants of North America. Most credible scholars believe that approximately 25,000 years ago, American Indians and Alaska Natives crossed the Bering Strait from Siberia and settled the entire Western Hemisphere over a period of 10,000 to 15,000 years.

Migration was common, but contact with European explorers and settlers forced two major periods of mass migration. First, the transmission of infectious diseases from early European settlers devastated the American Indian population. Many surviving Indians resettled in smaller, more widely separated groups. Second, a series of legislative acts was passed, forcing American Indians to settle into locations specified by law.

The Indian Removal Act of 1830 forced American Indians to move to territories west of the Mississippi River. By 1887, most American Indians were resettled on reservations or in the Indian territory of Oklahoma. After World War II, Congress passed the Indian Relocation Act of 1956. American Indians once again migrated, this time to urban areas, where they were encouraged to enhance their economic opportunity and assimilate into mainstream society even more than before (Centers for Disease Control and Prevention, 1992).

Today, nearly half of the American Indian population resides in the West, 30 percent in the South, 18 percent in the Midwest, and 6 percent in the Northeast. More than half of the Native population are located in seven States: Alaska, Arizona, California, New Mexico, North Carolina, Oklahoma, and Washington; the largest proportion resides in Oklahoma.

The Alaska Native population consists of Eskimos, American Indians, and Aleuts. Of the nearly 86,000 Alaska Natives living in Alaska, more than one-half of these are Eskimo, approximately one-third are American Indian, and slightly more than one-tenth are Aleut. The two main Eskimo groups living in Alaska are the Inupiat, who live in the north and northwest parts, and the Yupik, who live in the south and southwest parts. The primary American Indian tribes living in Alaska are Athabascan, Tlingit, Tsimshian, and Haida.

There are 314 Federal reservations and trust lands, 217 Alaska Native village statistical areas, 12 Alaska Native regional corporations, and 17 tribal jurisdiction statistical areas in the United States. Contrary to the popular belief that most American Indians and Alaska Natives live on reservations or in small villages, only about 22 percent of the American Indian and Alaska Native population live on reservations and historic trust lands and 15 percent live in tribal or village statistical areas. The rest, 63 percent, live in urban centers around the country. For Alaska Natives, however, only about one-third live in urban areas, primarily Anchorage, Fairbanks, and Juneau. The other two-thirds of the Alaska Native population live in one of more than 200 rural villages with populations of 50 to 1,000 people. Alaska Natives also live in the continental United States, especially the Northwestern States and California (National Cancer Institute, 1993).

Age

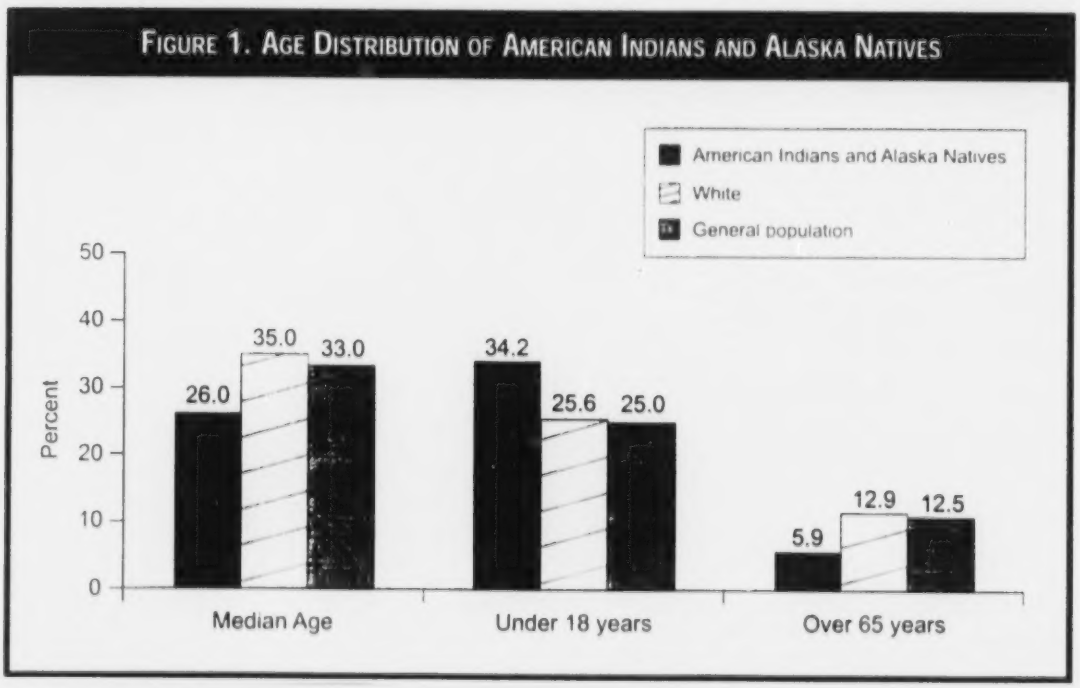
In general, American Indians and Alaska Natives are a much younger population than other racial groups, due in part to their high fertility rates. The American Indian median age in 1990 was 26 years, which is 7 years younger than the median age of 33 years for the general population (U.S. Bureau of the Census, 1993). Thirty-four percent of Native people are younger than age 18, compared to approximately 25 percent of the U.S. general population. In addition, only 6 percent of this population were older than age 65, compared to 13 percent of all races in the United States (U.S. Bureau of the Census, 1990). Figure 1 displays the age distribution of American Indians and Alaska Natives.

Education

Overall, American Indians have less education than the general population. According to 1990 census data, 66 percent of American Indians over age 25 have completed high school and about 9 percent possess a bachelor's degree or higher. In comparison, in the general population, 75 percent of persons over age 25 have completed high school and 20 percent have a bachelor's degree or higher, as shown in figure 2. Approximately 85 percent of American Indian youth attend public schools, 10 percent attend Bureau of Indian Affair (BIA) schools, and 5 percent attend private schools.

In addition, Alaska Natives are less likely to have graduated from high school or college than the general population in Alaska. Sixty-

Figure 1. Age Distribution of American Indians and Alaska Natives



Source: U.S. Bureau of the Census, 1993.

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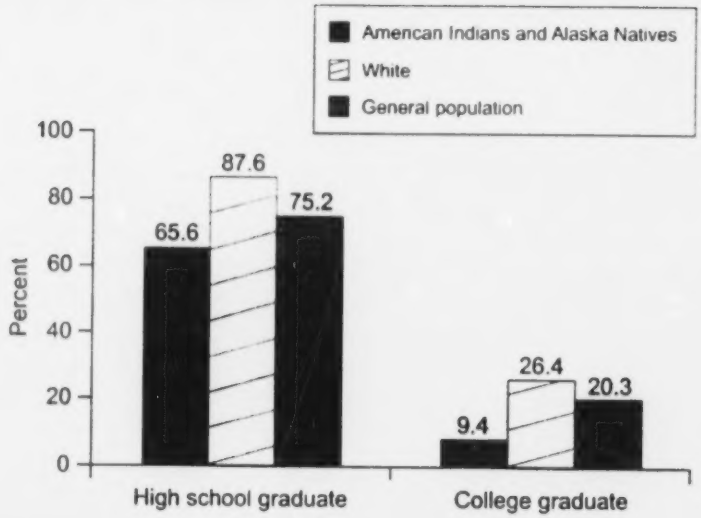
FIGURE 2. EDUCATIONAL ATTAINMENT OF AMERICAN INDIANS AND ALASKA NATIVES



Source: U.S. Bureau of the Census, 1990

three percent of Alaska Natives over age 25 completed high school or higher compared with 87 percent of the entire State population. In addition, only 4 percent of Alaska Natives had a college degree or higher compared with 23 percent of the statewide population.

INCOME AND EMPLOYMENT

American Indians and Alaska Natives tend to be poorer than other populations in the United States. In 1989, 31 percent of native people lived at or below the poverty level. This is more than twice the number of poor people in the total U.S. population (13 percent) and almost three times the number of whites living at or below the poverty level (12 percent). Twenty-one percent of Alaska Native families live below the poverty line, compared to 7 percent of all families in Alaska.

The median family income in 1990 for American Indians was $21,750, whereas the median family income for the total U.S. population was $35,225. Alaska Natives also earned less than other people in Alaska (figure 3). Although Alaska has the highest median family income ($46,581 a year) in the United States, the median family income among Alaska Natives was only $26,695, which is only 57 percent of the median income for the State. In Alaska, Aleut families earned an average of $36,472 followed by American Indians at $29,339, and Eskimos at $23,257.

American Indians residing on reservations and trust lands are the poorest segment of the American Indian and Alaska Native population. In 1989, 51 percent were living below the poverty level. The per capita income in 1989 ranged from slightly more than $3,000 per per-

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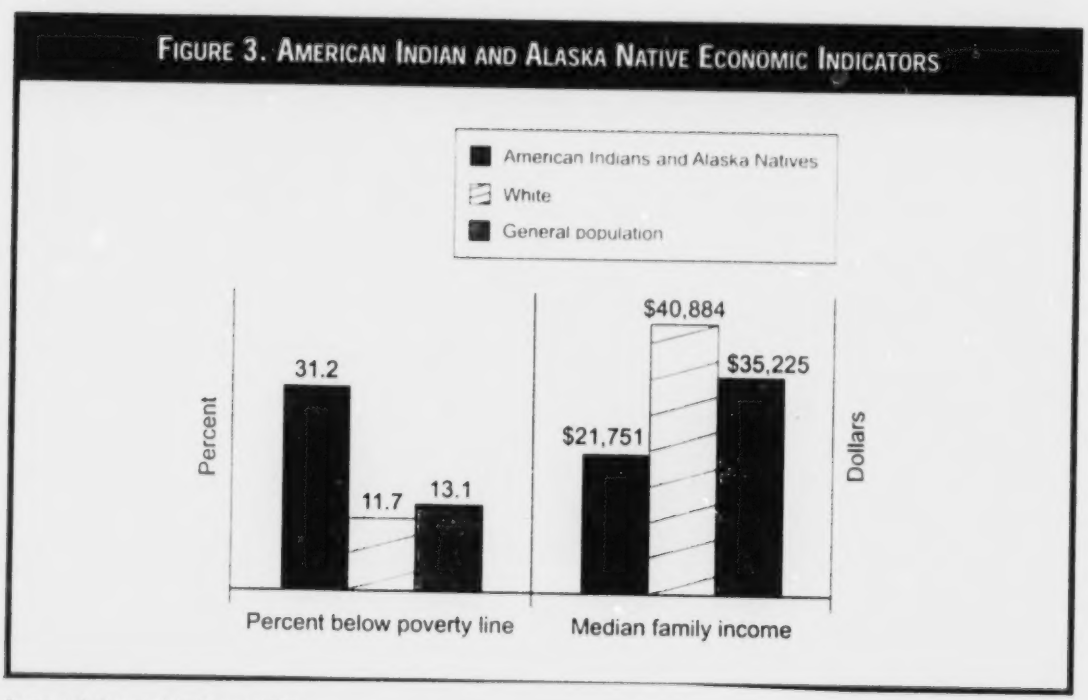
son to nearly $5,000 per person. One-fifth, or 20 percent, of the housing units on reservations and trust lands lacked complete plumbing facilities, compared with 6 percent of all American Indian households in the United States.

Overall, 62 percent of American Indians age 16 and older were in the labor force in 1990. The majority of American Indians were employed in agriculture, craft, and repair service occupations—namely, operators, fabricators, and laborers. A smaller proportion of American Indians and Alaska Natives than of the total population worked in managerial and professional specialty occupations.

Access to Health Care

The Indian Health Service is an agency within the U.S. Department of Health and Human Services. The IHS is responsible for providing comprehensive health services to members of federally recognized American Indian and Alaska Native tribes. An individual is eligible for services if he or she is "regarded as Indian by the community in which he [or she] lives as evidenced by such factors as tribal membership, enrollment, residence on tax-exempt land, ownership of restricted property, active participation in tribal affairs, or other relevant factors in keeping with general Bureau of Indian Affairs practices in the jurisdiction." The 1990 census identified more than 2 million people of Indian heritage; approximately 1.41 million of this group are eligible for IHS services (Indian Health Service, 1996). Most American Indians and Alaska Natives who do not receive IHS health services reside in urban areas.

Figure 3. American Indian and Alaska Native Economic Indicators



Source: U.S. Bureau of the Census, 1990.

The goal of the IHS is to raise the health status of American Indians and Alaska Natives by providing them preventive, curative, rehabilitative and environmental health services. Tribes are offered opportunities for maximum involvement in developing and managing programs to meet health needs. Health services are delivered directly through IHS facilities, through IHS contractual arrangements with providers in the private sector, and through tribally operated programs and urban Indian health programs.

The IHS health services delivery system is managed through 12 regional units called area offices, which cover all or parts of 33 States known as Reservation States. These area offices provide administrative support to 72 local service units, which are the basic health organizations for a geographic area served by the IHS. As of October 1994, these 72 IHS-operated service units administered 40 hospitals and 119 health centers, school health centers, and health stations.

Some of the health programs are operated by tribes, and a limited number of projects serve American Indians living in urban areas. In 1994, 71 tribally operated service units administered 9 hospitals and 342 health centers, health stations, and Alaska village clinics. Thirty-four Indian-operated urban projects ranged from information referral and community health services to comprehensive primary health care services.

American Indians and Alaska Natives obtain their health care through a variety of sources, not just through the IHS, tribally operated service units, and urban projects. Many have employer-sponsored medical benefits and use private practitioners and third-party payment. Native people not living in the 33 reservation States must either use alternative health care resources or travel great distances to obtain IHS services. In addition, the transitory lifestyle of many American Indians who migrate between reservations and cities in search of employment may contribute to the lack of health care access for this migrant population.

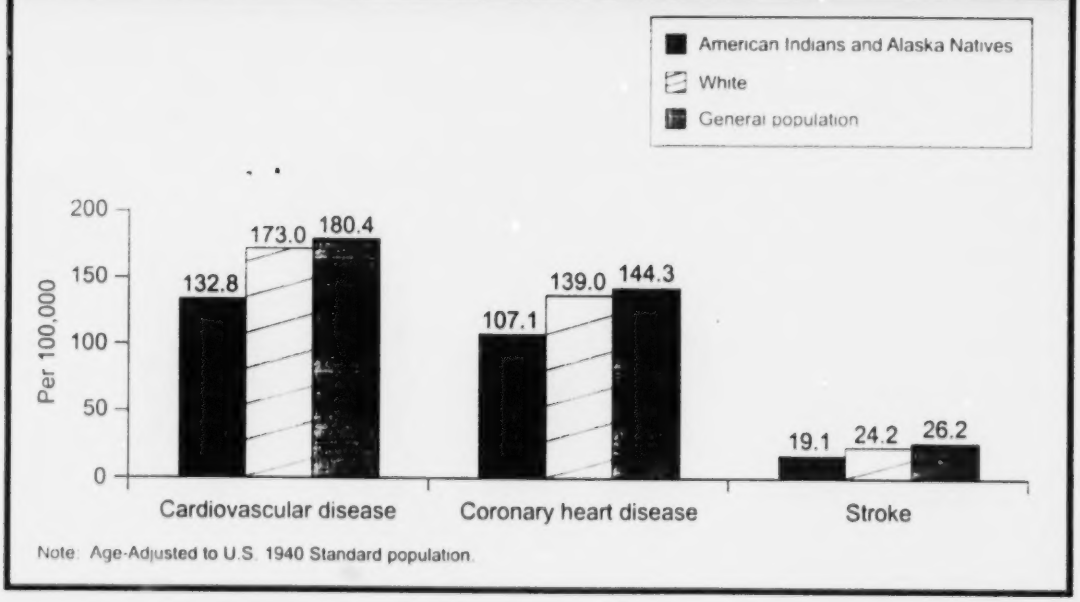
Cardiovascular Disease Among American Indians and Alaska Natives

Cardiovascular Disease Mortality

Cardiovascular disease is the leading cause of death in the United States regardless of gender, race, or ethnicity. For CVD deaths in the total population, the 1992 age-adjusted death rate was 180.4 deaths per 100,000 population. The age-adjusted death rates for the two major components of CVD—coronary heart disease and stroke—were 144.3 and 26.2 respectively. Only recently has CVD been prevalent among American Indians and Alaska Natives.

Although overall mortality rates for native people are lower than those of the general population, CVD is now the leading cause of death for this population. The CVD death rate for native people is 132.8 deaths per 100,000 population. The mortality rate for coronary heart disease (CHD) in native people is 107.1 cases per 100,000 population. The mortality rate for stroke, the fifth leading cause of death for this population, is 19.1 cases per 100,000 population (Plepys and Klein, 1995) (figure 4). Mortality rates for both CHD and cerebrovas-

Figure 4. Age-Adjusted CVD Mortality Among American Indians and Alaska Natives



Note: Age-Adjusted to U.S. 1940 Standard population.

Source: Plepys and Klein, 1995

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cular disease is higher for native people residing in the IHS service area: in 1990-92, the CHD mortality rate was 114.2 cases per 100,000 population and the stroke mortality rate was 23.0 cases per 100,000 population (Indian Health Service, 1996).

Risk Factors

Population-based studies have led to the identification of risk factors for cardiovascular disease. Although some risk factors such as age, gender, and family history cannot be controlled, others can be prevented and managed by altering one's lifestyle, thus reducing the risk of cardiovascular disease. Modifiable risk factors include high blood cholesterol, high blood pressure, smoking, physical inactivity, diabetes, obesity, and heavy alcohol consumption. The following section discusses the most common modifiable risk factors for cardiovascular disease and their effects on American Indians and Alaska Natives.

High Blood Cholesterol

Cholesterol is a waxy substance that the body manufactures to make hormones, vitamin D, and bile acids. The body produces enough cholesterol to fill its needs, but cholesterol also is taken into the body through the diet. Over time, extra cholesterol and fat circulating in the blood can accumulate on the inner walls of the arteries that supply blood to the heart. These deposits narrow the arteries, slowing or even blocking the flow of blood to the heart and increasing the risk of cardiovascular disease.

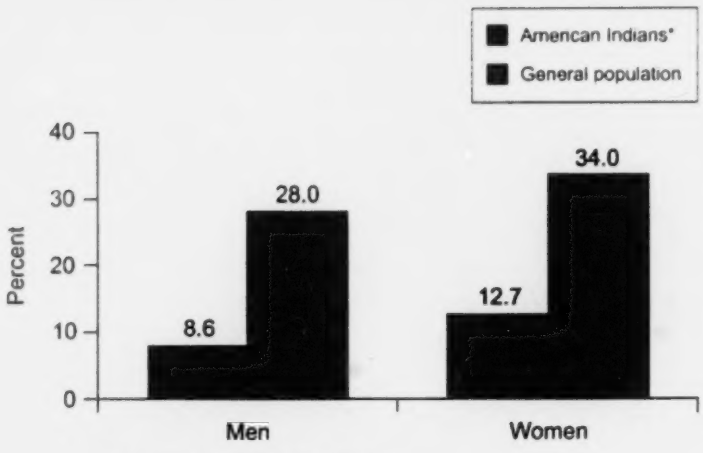
The National Cholesterol Education Program has defined ranges for blood cholesterol levels as desirable, borderline-high, and high blood cholesterol. For adults, a blood cholesterol level lower than 200 mg/dL is desirable. A cholesterol level between 200 and 239 mg/dL is considered borderline-high, and high blood cholesterol is defined as 240 mg/dL or greater (National Cholesterol Education Program, 1993).

Two specific kinds of blood cholesterol are low-density lipoprotein (LDL) cholesterol and high-density lipoprotein (HDL) cholesterol. LDL cholesterol, sometimes called "bad" cholesterol, causes cholesterol to accumulate in the walls of the arteries. The more LDL that exists in the blood, the greater the risk for heart disease. Conversely, HDL cholesterol has been dubbed "good cholesterol" because it helps the body remove the cholesterol from the blood. Unlike total and LDL cholesterol, more HDL cholesterol in the blood reduces the risk for heart disease.

Although the mean total cholesterol levels of American Indians and Alaska Natives are generally lower or comparable to the levels of other U.S. populations, variation occurs between regions. Data from the Strong Heart Study, a study of 12 tribes in Arizona, North Dakota, Oklahoma, and South Dakota indicated that 30 to 40 percent of all American Indians had cholesterol levels greater than 200 mg/dL. Twenty five percent of the Arizona Pima Indians had blood cholesterol levels at or above 200 mg/dL compared with 47 percent of the North Dakota and South Dakota participants. Furthermore, the high blood cholesterol rates for American Indians were lower than those of the U.S. general population. The prevalence of high blood cholesterol (≥ 240 mg/dL) among men of all races in the United States is 28 percent and 34 percent for women. In the Strong Heart Study the prevalence of high blood cholesterol was 8.6 percent for males and 12.7 percent for females (Welty et al., 1995) (figure 5).

Thirty-four percent of Navajo men age 25 to 74 had elevated total cholesterol levels compared to 28 percent of men of the same age group studied in the 1976-80 National Health

FIGURE 5. HIGH BLOOD CHOLESTEROL AMONG AMERICAN INDIANS, 45 TO 74 YEARS OLD



High blood cholesterol ≥ 240 mg/dL.

*American Indians from Arizona, Oklahoma, North Dakota, and South Dakota.

Source: Welty et al., 1995, NHANES III

and Nutrition Examination Survey (NHANES II). Younger Navajo women had total cholesterol concentrations similar to those for women younger than age 55 from the NHANES II, but the cholesterol levels were significantly lower among older Navajo women. Interestingly, the prevalence of total cholesterol concentrations greater than 240 mg/dL was 17.5 percent in Navajo women, which was about half the prevalence rate of women studied in the NHANES II (32.9 percent) (Sugarman et al., 1992).

High Blood Pressure

Blood pressure is the force of the blood pushing against the walls of the arteries. Several factors affect blood pressure, including the amount of blood flowing through the arteries, the rate of blood flow, and the resiliency of the arterial walls. High blood pressure, also called hypertension, occurs when there is resistance to blood flow through the arteries and the heart exerts extra pressure to carry blood to vital organs and muscles. High blood pressure not only increases the risk of heart attack and stroke, but it is also closely linked to congestive heart failure, chronic occlusive peripheral vascular disease, aortic aneurysm, and renal failure. It is often called the "silent killer" because many people are not aware of their symptoms until damage has already been done to the heart, brain, or kidney.

Blood pressure is reported in two numbers. The first number, systolic blood pressure, denotes the point of greatest pressure, when the heart contracts and pumps blood through the arteries. The second number, diastolic blood pressure, represents the point of lowest pressure when the heart relaxes between beats. A reading of 120/80 mm Hg is considered optimal blood pressure (National High Blood

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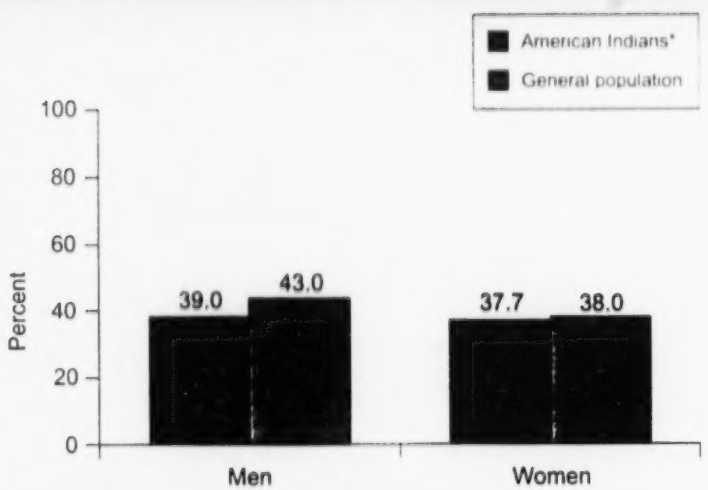
Pressure Education Program, 1993b). Persons are considered to have hypertension if their systolic blood pressure measures 140 mm Hg or higher, their diastolic blood pressure measures 90 mm Hg or higher at two or more visits over one to several weeks, or they are currently taking medication for high blood pressure (National High Blood Pressure Education Program, 1993a).

The risk of cardiovascular morbidity, disability, and mortality increases progressively with incremental increases in blood pressure. Even persons with high-normal blood pressure (systolic blood pressure of 130 to 139 mm Hg or diastolic blood pressure of 85 to 89 mm Hg) are considered at increased risk for disease (National High Blood Pressure Education Program, 1993a). However, data show that even a slight decrease in blood pressure levels can substantially reduce cardiovascular risk. For example, a downward shift of only 2 mm Hg in the average national systolic blood pressure might reduce the annual mortality from stroke, heart disease, and all causes by 6, 4, and 3 percent, respectively (National High Blood Pressure Education Program, 1993b).

The incidence of high blood pressure is increasing in native populations. Hypertension accounts for 42 percent of all IHS ambulatory visits, exceeded only by upper respiratory infections, otitis media, and diabetes (National Heart, Lung, and Blood Institute, 1996b). An important aspect of high blood pressure among American Indians and Alaska Natives is its strong association with diabetes and the apparent synergistic increase in morbidity when the two occur together (National Heart, Lung, and Blood Institute, 1996b). Figure 6 shows the prevalence rates of high blood pressure (≥ 140/90 mmHg or taking antihypertensive

FIGURE 6. HIGH BLOOD PRESSURE AMONG AMERICAN INDIANS, 45 TO 74 YEARS OLD



High blood pressure = 140/90 mm Hg or taking antihypertensive medication.

*American Indians from Arizona, Oklahoma, North Dakota, and South Dakota.

Source: Welty et al., 1995; NHANES III.

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medication) among male and female Strong Heart participants.

The prevalence of hypertension varies by the region and by tribe. Studies show that Yaqui Indians of Arizona, the urban Chippewa of Minnesota, and the Cree and Ojibwa tribes all had higher systolic blood pressure than whites, and all but the Chippewa had higher diastolic blood pressure than their white counterparts (Ellis and Campos-Outcalt, 1994). Data from the Strong Heart Study revealed that American Indians age 45 to 74 living in Oklahoma and Arizona had higher rates of hypertension (42 to 47 percent) than the country as a whole (38 to 43 percent) for similar age groups in 1988-91 (Welty et al., 1995).

Pima Indians appear to have a higher prevalence of high blood pressure than other American Indian and Alaska Native tribes. One study indicates that, in 1992, more than 40 percent of male and more than 30 percent of female Pima Indians had hypertension, compared to less than 20 percent of male and approximately 15 percent of female American Indians and Alaska Natives served by the Indian Health Service (National Heart, Lung, and Blood Institute, 1996b).

Some native people, however, have hypertension prevalence rates lower than other U.S. populations. The mean systolic and diastolic blood pressure of Yupik Eskimos was lower than whites in the 1988-91 NHANES (NHANES III), except for Yupik females age 30 to 40, who had diastolic blood pressure levels similar to African Americans in the NHANES III (National Heart, Lung, and Blood Institute, 1996b). Among Strong Heart Study participants living in North Dakota and South Dakota, only 27 percent of men and 28 percent of women had hypertension in 1988-91, compared to 43 percent of men and 38 percent of women of all races in the United States (Welty et al., 1995).

The level of hypertension awareness was high in Strong Heart Study participants with high blood pressure. About 75 percent of participants were aware that they had hypertension, and more than 50 percent of the persons with hypertension were treating and controlling it. This level of awareness was comparable to those of white and African American participants with hypertension in the NHANES III (Welty et al., 1995).

Cigarette Smoking

Cigarette smoking is an independent risk factor for cardiovascular disease and acts synergistically with other risk factors such as high blood pressure and high blood cholesterol. The estimated number of preventable deaths in the United States from coronary heart disease alone related to smoking is more than 90,000 deaths each year, and an additional 37,000 deaths from CHD are attributed to passive smoking each year. Cigarette smoke is estimated to be responsible for more than 20 percent of all CHD deaths in men age 65 and older and for approximately 45 percent of deaths in men younger than age 65 (McBride, 1992). The risk for CHD attributable to smoking in women is similar. In the Nurses' Health Study, more than 50 percent of the risk for premature fatal and nonfatal CHD was attributable to smoking (McBride, 1992).

Cigarette smoking contributes greatly to the development and progression of atherosclerosis in coronary arteries, thrombosis, and acute and chronic CHD events. Exposure to smoke causes coronary blood vessels to constrict, which may promote endothelial injury and lead to plaque development or progression and local thrombosis. Smoking also increases the stickiness of blood platelets, promoting their adhesion to the lining of the arteries and increasing the likelihood of a clot forming in the narrowed arteries. The degree of risk of smoking is related to the number of cigarettes

smoked, and heavier smoking is associated with even higher risk of death and myocardial infarction (McBride, 1992).

In smokers, a combination of factors sets the stage for a heart attack. Smoking increases oxygen demand by raising the heart rate, blood pressure, and peripheral arterial resistance. In addition, carbon monoxide in smoke binds to hemoglobin in red blood cells, thereby reducing the oxygen-carrying capacity of the blood. This altered ability of coronary vessels to regulate blood flow, coupled with a decreased oxygen-carrying capacity, can produce ischemia and possibly sudden death. One study examining the effects of smoking in CHD patients revealed 33 percent more episodes of ischemia per day and a significantly longer duration of ischemia in smoking patients. Cohort and population studies demonstrate that cigarette smoking substantially increases the risk of sudden death (McBride, 1992).

Cigarette smoking is also associated with changes in the lipoprotein distribution. Nicotine elevates very-low-density lipoprotein cholesterol while reducing high-density lipoprotein cholesterol. These combined effects may promote endothelial cell injury and reduce vascular repair mechanisms.

Cigarette smoking cessation, however, is related to a marked decrease in CVD, including reduced cardiac arrest, coronary death, and myocardial infarction. Studies of both men and women consistently suggest a large reduction of cardiovascular risk following 1 year of smoking cessation and a gradual return over 5 to 10 years to risks similar to those of people who never smoked.

Passive smoking is also an important risk factor for heart disease morbidity and mortality. Evidence from numerous studies links environmental tobacco smoke (ETS) to heart disease mortality and accounts for 70 percent of all deaths due to ETS. Evidence also indicates that nonsmokers are more sensitive to smoke, including cardiovascular effects, and that passive smoke contains a higher concentration of gas constituents, including carbon monoxide (McBride, 1992).

Smoking has long been part of the culture of many American Indian tribes. Men smoke tobacco and the dried leaves, roots, and bark of other plants on ceremonial and social occasions. For tribes like the Chippewa, tobacco is considered a gift from the spirit and thus has "magic power." It increases the efficacy of a request and makes an obligation or agreement more binding (Gillum et al., 1984).

Today, many American Indians and Alaska Natives smoke and no longer solely for spiritual reasons. Studies have shown a higher prevalence of smoking among American Indians than whites; however, there are substantial regional variations. The national smoking prevalence rates for 1987-91 among native people were 33 percent for men and 27 percent for women, compared to 26 percent for white men and 23 percent for white women.

Data from the Strong Heart Study show that smoking rates in some regions may be even higher. In North Dakota and South Dakota, 53 percent of men and 45 percent of women smoked (Welty et al., 1995). In a cross-sectional study of Pascua Yaqui Indian adults age 25 to 65 in Arizona, 43 percent of men and 24 percent of women reported smoking (Campos-Outcalt et al., 1995). Among Alaska Natives, 47 percent of men and 39 percent of women smoke (Department of Health and Social Services, 1996). Overall, men tended to smoke more cigarettes than women in all age groups (Campos-Outcalt et al., 1995).

These high rates are not indicative of all American Indian and Alaska Native populations, however. A study conducted on adult Pima Indians in Arizona indicated a very low prevalence of cigarette use; less than 1 percent smoked (Nelson et al., 1990). The Strong Heart Study also confirmed these low rates of smoking in the Southwest. The prevalence of smoking among American Indians in Arizona was 30 percent of men and 13 percent of women.

The use of cigars, pipes, and smokeless tobacco appears to be uncommon among adults. Fewer than 5 percent of the Strong Heart Study participants smoked cigars or pipes, and smokeless tobacco use was rare (Welty et al., 1995). However, higher rates of smokeless tobacco use have been reported in American Indian children and adolescents, especially those living on reservations (National Cancer Institute, 1993).

Although adult American Indian men smoke more than women, data from an Indian Adolescent Health Survey reveal the opposite. This survey, administered to 13,454 students in seventh through twelfth grade, revealed that for every grade level after the seventh grade, females were more likely to be daily cigarette smokers than males, rising from 9 percent in junior high school to 18 percent in high school. The percentage for males increased from 8 percent in junior high school to 15 percent in high school. However, daily use of smokeless tobacco was higher for males than females, with 17 percent of high school males using smokeless tobacco compared to 8 percent of females.

Data from the 1990 Great Alaska Spit-Out Tobacco Use Survey, completed by 1,555 Alaskan schoolchildren, showed that the prevalence of both cigarette smoking and use of smokeless tobacco was 16 percent each (National Cancer Institute, 1993). A study by Beauvais (1992) showed that cigarette use was highest for American Indian youth living on reservations compared to nonreservation Indian youth and white youth. Up to 74 percent of eighth graders and 80 percent of twelfth graders living on reservations smoke cigarettes. Smoking prevention programs need to focus on native youth before they begin using tobacco.

Physical Inactivity

Evidence indicates that physical inactivity is an independent risk factor for heart disease. People who are physically inactive are almost twice as likely to develop heart disease than those who are more active (National Institutes of Health, 1995). Physical activity may protect against the development of CVD and may help control high blood cholesterol, high blood pressure, diabetes, and obesity. Several studies have shown that exercise training programs significantly reduce overall mortality as well as death caused by myocardial infarction.

The NIH Consensus Statement on Physical Activity and Cardiovascular Health recommends a minimum of 30 minutes of moderate-intensity physical activity on most, and preferably all, days of the week for all children and adults. In addition to formal exercise programs, occupational, nonoccupational, and daily living tasks such as brisk walking, home repair, and yardwork have similar cardiovascular and health benefits if performed at a level of moderate intensity with an accumulated duration of at least 30 minutes per day. The recommended daily duration may be broken up into shorter bouts of activity of at least 10 minutes each.

A sedentary lifestyle has replaced a traditional American Indian lifestyle of long ago, when hunting, fishing, and gathering was a way of life. Isolation, a high unemployment rate, extreme weather conditions, and a lack of

recreational facilities all contribute to television being used as a means of entertainment and occupying idle time. American Indians in the Strong Heart Study reported watching television an average of 3 hours per day. A sedentary lifestyle was common among the three groups, with Arizona Indians being the least active. In all centers, 38 percent of men and 48 percent of women reported no activity during the past week and 17 percent of men and 20 percent of women reported no activity during the past year (Welty et al., 1995).

Diabetes Mellitus

Diabetes mellitus is a group of disorders characterized by high blood glucose levels. Type I, or insulin-dependent diabetes mellitus (IDDM), is an autoimmune disease that is rare among American Indians and Alaska Natives. It occurs when the insulin-producing beta cells in the pancreas are destroyed. People with type I diabetes must have daily insulin injections to survive. Type II, or non-insulin-dependent diabetes mellitus (NIDDM), occurs when body cells become resistant to insulin and do not metabolize glucose properly. Type II diabetes is more common among adults, especially those who have a family history of diabetes, are overweight, are older than age 40, and are of African American, Latino, or American Indian descent. Many people with type II diabetes are able to control their blood sugar through weight control, regular exercise, and a healthful diet. Some may need insulin injections or oral medications to lower their blood sugar (National Institute of Diabetes and Digestive and Kidney Diseases, 1992).

Type II diabetes, once rarely diagnosed among American Indians, has reached epidemic proportions in many American Indian and Alaska Native communities. Although NIDDM has a genetic component, with rates highest in full-blooded American Indians, the incidence and prevalence of the disease has increased dramatically as native people adopt Western lifestyles, with accompanying increases in body weight and diminished physical activity.

A 1987 Special Medical Expenditure Survey of American Indians and Alaska Natives eligible for IHS services showed that the age- and sex-adjusted diabetes rate in individuals older than age 19 was 12 percent, compared with 5 percent in the general population. However, the prevalence of diabetes varies considerably between regions. Only 4 cases of diabetes per 1,000 population were found among the Inuit of the Northwest Territories, whereas the Pima Indians of Arizona have a prevalence of 500 cases per 1,000 population, the highest rate of NIDDM in the world (National Institute of Diabetes and Digestive and Kidney Diseases, 1995b).

Among Alaska Natives, the prevalence of diabetes was 16 cases per 1,000, but prevalence varied by ethnic group: 27 cases per 1,000 among Aleuts, 22 cases per 1,000 among Alaskan Indians, and 9 cases per 1,000 among Alaskan Eskimos (Schraer et al., 1988). Among participants of the Strong Heart Study, 65 percent of Arizona Indian men and 71 percent of Arizona Indian women had diabetes. In Oklahoma, North Dakota, and South Dakota, 33 percent of men and approximately 40 percent of women had diabetes. Diabetes appeared to be more prevalent among women than men (Welty et al., 1995).

Diabetes and its complications are a major cause of morbidity and mortality in native populations. The age-adjusted diabetes death rate for American Indians in 1984-86 was 2.7 times the rate for the general population. This reflects only cases in which diabetes was the primary cause of death, not those in which it was a contributing cause. The National Mortality Followback Study also found that American Indian and Alaska Native heritage

was underreported on death certificates by 65 percent. When the 1986-88 relative mortality rates were adjusted for underreporting of heritage, the diabetes mortality for native people was 4.3 times the rate for whites (National Institute of Diabetes and Digestive and Kidney Diseases, 1995a).

A New Mexico study demonstrated that American Indians experienced 3.6 times the diabetes death rates of whites, and a mortality study on Canadian Indian reservations in seven provinces found the risk of death from diabetes to be 2.2 times higher for Canadian Indian men and 4.1 times higher for Canadian Indian women than the rates for the Canadian population as a whole (National Institute of Diabetes and Digestive and Kidney Diseases, 1995a). Detailed mortality studies in Pimas during 1975-84 found that the age- and sex-adjusted death rate from diabetes was 11.9 times greater than the 1980 death rate for all races in the United States (National Institute of Diabetes and Digestive and Kidney Diseases, 1995a).

The health burden from NIDDM comes primarily from complications. Kidney disease, cardiovascular disease, stroke, eye disease, and amputations caused by nerve disease are some of the long-term complications that arise from NIDDM. Between 1983 and 1986, kidney disease resulting in end-stage renal disease occurred in Indians at nearly six times the rate seen among U.S. whites. Researchers have found that Pima Indians have more than 20 times the rates of new cases of kidney failure as the general U.S. population, and diabetes is responsible more than 90 percent of the time (National Institute of Diabetes and Digestive and Kidney Diseases, 1995a).

Cardiovascular disease is two to four times more common in people with diabetes. In fact, cardiovascular disease is present in 75 percent of diabetes-related death. Diabetes is related to lipoprotein metabolism, atherosclerosis, obesity, and hypertension. Diabetes is an independent risk factor for CHD, and the risk is doubled when high blood pressure is present (National Heart, Lung, and Blood Institute, 1994).

Studies of specific tribes clearly suggest that diabetes is a major risk factor for cardiovascular disease in all Native populations. Among Navajos, half of all diagnosed myocardial infarctions documented from 1976-79 to 1984-86 occurred in people with diabetes. In one study, nearly one-third of all participants with diabetes also had cardiovascular disease. Of those age 60 and older, who constitute nearly half of the population with diabetes, 33 percent of the women and nearly 60 percent of the men were afflicted. Age-adjusted rates for persons with diabetes were 5.2 times those of persons without diabetes for heart disease, 10.2 times for cerebrovascular disease, and 6.8 times for peripheral vascular disease (Hoy et al., 1995). In Pima Indians, a tribe with low coronary heart disease rates, all CHD deaths during 1975-84 occurred in persons with diabetes. The study found that a longer duration of diabetes was associated with an increased incidence of fatal CHD in Pima Indians (Nelson et al., 1990). In Strong Heart Study participants, diabetes was the strongest risk factor for CVD, especially among women (Howard et al., 1995).

Obesity

The prevalence of overweight and obesity are usually measured using body mass index (BMI), which is a ratio relating body weight to height. Overweight is defined as a BMI of 25 to 29.9 kg/m^2. Obesity is defined as a BMI of 30. Waist circumference is positively correlated with abdominal fat content. Adults with a BMI of 25 to 34.9 kg/m^2 are considered to be at greater risk for obesity-related factors if their waist measurement is greater than 40

inches for men and 35 inches for women (National Heart, Lung, and Blood Institute, 1998).

Obesity is associated with an increased risk for high blood pressure, diabetes, and high blood cholesterol. Even mild to moderate overweight is associated with a substantial elevation in coronary risk. However, weight loss can reduce cardiovascular risk. Data from the Coronary Artery Risk Development in Young Adults (CARDIA) study show that weight loss (initial loss of 5 pounds without regain of more than 5 pounds over 5 years) decreases blood pressure and raises HDL cholesterol levels (National Heart, Lung, and Blood Institute, 1994).

In the early 1900s, obesity was rare among American Indians and Alaska Natives; however, by the late 1960s, high rates of obesity were reported in some tribes. In the 1987 National Medical Expenditure Survey, 34 percent of American Indian males were overweight compared to 24 percent of males in the general population. Similarly, 40 percent of American Indian females were overweight compared to 25 percent of females in the general population. The prevalence of obesity in American Indians was also high—14 percent for males and 17 percent for females—compared with whites—9 percent for males and 8 percent for females (Broussard et al., 1991). In 1993, 48 percent of American Indian and Alaska Native adults were overweight (National Center for Health Statistics, 1995).

Data from the Strong Heart Study showed that the prevalence of overweight exceeded national averages by 16 to 36 percent in 1988-91. The highest rate of overweight was among Arizona Indians; 41 percent of the men were obese and 26 percent were overweight. For women, 50 percent were obese and 30 percent were overweight. The waist-to-hip ratio indicated that central obesity, another major risk factor for heart disease, predominates in both sexes (Welty et al., 1995).

In another study, the prevalence of overweight was 34 percent and 56 percent among Eskimo men and women, respectively, and 29 percent and 55 percent among Alaskan Indian men and women. A recent study of Navajo adults indicates that 51 percent of women and 33 percent of men are overweight (Broussard et al., 1995).

The prevalence of obesity was also evident among American Indian children, even those as young as 5 years old. A study of American Indian children age 0 to 4 participating in public health programs revealed that they were more likely to be overweight than children of the same age in the general population. In 1988, 11 percent of American Indian children under 5 years old were overweight compared to 8 percent of their counterparts in the general population (Broussard et al., 1991). A 1990 national survey of 9,464 American Indian schoolchildren age 5 to 18, excluding Navajo Indians, showed that the overweight prevalence was high for all ages and for both sexes. According to this survey, the overall prevalence of overweight was 39.3 percent (Jackson, 1993).

Genetic predisposition is an important determinant of obesity. Studies of twins and adoptees have shown that body fat is transmitted genetically to a moderate extent. One study estimates that about 25 percent of the variation in body fat is genetic, and much of the variation is due to environmental factors such as level of physical activity and diet (National Heart, Lung, and Blood Institute, 1994).

Neel's "thrifty gene theory," proposed in 1962, may partially explain the propensity for American Indians and Alaska Natives to be overweight and obese (Neel, 1962). This theo-

ry postulates that, in order for populations to survive alternating periods of feast and famine, people developed a thrifty gene to allow them to store fat when food was abundant so that they would not starve in times of famine. With the introduction of a lifestyle characterized by a high-fat diet, less physical exercise, and a continuous and ample food supply, this gene began to work against them, continuing to store calories in preparation for food scarcity. This thrifty gene that once protected people from starvation also might contribute to their retention of unhealthy amounts of fat (National Institute of Diabetes and Digestive and Kidney Disorders, 1995a).

Dietary Consumption Practices of American Indians and Alaska Natives

Over the last 30 years, the traditional foods—such as corn, buffalo, and venison—consumed by Native people have been replaced by processed and commercially prepared foods. Although there are tremendous gaps in knowledge about the contemporary consumption practices of American Indian tribes and Alaska Native communities, a few studies shed some light on this area. A food frequency survey conducted on Mvskoke Indians in Oklahoma showed that their diets were generally high in fat, calories, and sugar (Russell et al., 1994). Respondents stated that they ate processed meats, hamburger, snack chips, and sweet rolls on a regular basis. Meat was typically fried, and vegetables were usually cooked in bacon fat or butter. They rarely relied on hunting, fishing, and butchering livestock and usually ate traditional food only at tribal celebrations (Russell et al., 1994).

Data from the Strong Heart Study (1989-91) showed that mean food energy intakes of participants were below the recommended daily allowance. Mean total fat intakes as a percentage of calories were consistently above 30 percent of calories, and mean intakes of dietary fiber were below the recommended intake of 20 to 30 grams per day for healthy adults (Federation of American Societies for Experimental Biology, 1995). This study also revealed numerous variations in diet among the three communities. The Pima Indians of Arizona had the highest fat and cholesterol consumption, but also the highest fiber intake, compared to the other two sites. The Oklahoma group overall consumed a wider variety of foods and more fruits and vegetables, both fresh and canned; however, they also ate more beef, bacon, hot dogs, and fats (National Heart, Lung, and Blood Institute et al., 1993).

A dietary survey of Pima Indians in Arizona showed that their diet has been influenced by mainstream American foods, Mexican foods, and the food distribution programs operating in the community. For example, the typical American-style breakfast of eggs, bacon or sausage, and fried potatoes is common, as are Mexican-style dishes such as tacos, tamales, menudo (entrails soup), and chorizo (sausage). Staples derived from the food commodity programs including canned meats, vegetables, and American cheese are reflected in typical dishes such as "cheese crisp" (melted cheese on a tortilla) and corned beef with gravy or potatoes. Hamburger and pork chops are the most widely used meats, and the traditional Pima intake of legumes is evident in the combination of pinto beans with many foods. Pimas also eat white bread, flour tortillas, and fry bread (a type of biscuit dough formed into balls and fried). Traditional desert foods such as "wild spinach," tepary beans, and cholla (cactus) are eaten infrequently and more by the older age groups or at community gatherings.

The sodium intake in Pima Indians is close to the recommended level for adults and is gener-

ally lower than the mean intake for the general population. However, Pima Indians consume too much of their fat as saturated fat and too little as polyunsaturated fat, according to the recommendations of the National Cholesterol Education Program. Moreover, the average cholesterol intake is far above the maximum recommended level of 300 mg per day (Smith et al., 1996).

A 1987-88 assessment of the dietary intakes of Alaska Native adults from 11 communities revealed that they consumed more protein, fat, carbohydrates, iron, and vitamins A and C than the general population; however, they also consumed less calcium, fruits, and vegetables (Nobmann et al., 1992). Alaska Natives maintain a heavy reliance on traditional foods and eating practices, consuming high amounts of fish and shellfish. The percentage of fat consumed was 35 to 39 percent, greater than the recommended level of below 30 percent. The major contributors of fat were fish, agutuk (Eskimo ice cream), beef, seal oil, whale blubber, chicken, butter, and margarine. Agutuk, beef, and butter contribute to the saturated fatty acid intake and may be an important contributor to the static rate of heart disease among Alaska Natives. Berries and seaweed are typical fruits and vegetables eaten by Alaska Natives; however, they generally consumed only one or two fruits or vegetables per day, much less than the recommended five per day. Dark green, yellow, and cruciferous vegetables were eaten very infrequently (Nobmann et al., 1992).

Alcohol Consumption

Although considerable evidence shows that moderate alcohol consumption (defined as no more than one drink per day for most women and no more than two drinks per day for most men) decreases the risk of death from coronary artery disease, numerous studies have shown an association between chronic heavy drinking and high blood pressure, cardiomyopathy, arrhythmias, and stroke (National Institute on Alcohol Abuse and Alcoholism, 1993).

Many epidemiological studies have identified a positive association between alcohol intake (three or more drinks or roughly 40 grams of alcohol per day) and the level of blood pressure. Data from cross-sectional studies show that as much as 5 to 7 percent of the overall prevalence of hypertension can be attributed to an alcohol intake of three or more drinks per day (National High Blood Pressure Education Program, 1993b). The risk for hypertension among individuals drinking three or more drinks per day was 50 percent higher than among nondrinkers; the risk among individuals consuming six or seven drinks per day was 100 percent higher. A recent study also demonstrated that the mean systolic and diastolic blood pressure was 6.6 and 4.7 mm Hg higher, respectively, among daily drinkers than among individuals who drank less than once a week (National Institute on Alcohol Abuse and Alcoholism, 1993).

Studies show that chronic alcohol consumption also is associated with increased risk of stroke, cardiomyopathy, and arrhythmias. Heavy drinking (about five drinks per day) increases by fourfold the risk of hemorrhagic stroke and may contribute to an estimated 20 to 30 percent of cardiomyopathy cases. Furthermore, the high incidence of sudden death in alcoholics may be explained in part by alcohol-related arrhythmias (National Institute on Alcohol Abuse and Alcoholism, 1993).

Alcohol-related morbidity and mortality are high in most American Indian populations, causing high rates of premature loss of life. For men age 45 to 64, cirrhosis is the second leading cause of death among American

Indians and Alaska Natives. The mortality rate due to cirrhosis is about twice as high for native men as for white men (Centers for Disease Control and Prevention, 1992). For native people in the IHS service area, the mortality rate is more than three times that of whites (Indian Health Service, 1996).

In 1990-92, the age-adjusted alcoholism mortality rate for the IHS service area population was 37.2 cases per 100,000 population. When the three IHS areas with problems in underreporting of American Indian race on death certificates were excluded, the age-adjusted mortality rate increased to 52.6 cases per 100,000 population. This was 674 percent higher than the general population rate of 6.8 cases per 100,000 in 1991. These rates vary by region, however. The mortality rate was 89.3 deaths per 100,000 population in the Aberdeen area (North Dakota and South Dakota), compared to 9.2 deaths per 100,000 population in the Oklahoma area (Indian Health Service, 1995b).

The 1990 national rates showed that among American Indians and Alaska Natives age 45 or older, 63 percent of men and 41 percent of women currently use alcohol (Welty et al., 1995). Data from the Strong Heart Study, however, showed that participants drank less than these given rates: 55 percent of men and 32 percent of women were current alcohol drinkers (Welty et al., 1995). On the other hand, the rates of heavy drinking (14 or more drinks per week) and binge drinking (5 or more drinks per occasion) were higher among Strong Heart Study participants who had consumed alcohol during the past year than was reported in national surveys (Welty et al., 1995). Heavy drinking and binge drinking have been associated with many adverse health events, including sudden death.

American Indian and Alaska Native Culture and Perceptions of Health

An understanding of American Indian and Alaska Native cultures is essential to creating programs that are relevant, appropriate, and acceptable to the target population. Culture is the integrated pattern of knowledge, beliefs, and behaviors that colors the way one sees the world and serves as a framework within which individuals function throughout their daily life. It is the set of values that helps define the relationship of individuals to their environment and to other individuals (Paniagua, 1994).

Although the American Indian population is very diverse, some parallels exist in the basic beliefs and values many American Indians share. Unlike mainstream U.S. culture, which strongly values individualism and the nuclear family, American Indians and Alaska Natives are characterized by a strong family and community structure. They also value harmony with the environment and traditional methods of healing.

Social Structure

American Indians and Alaska Natives strive for integration within the family, clan, and tribe. In contrast to the mainstream Anglo-American culture of nuclear family, American Indians value the extended family above the self. The familial structure is usually intergenerational and includes members of the specific clan and tribe as well as individuals from the community who have made significant contributions to the family's survival. Fathers (or older adults) "manage" the American Indian family rather than control it, unlike Asian or Hispanic fathers who often control their families by authority or machismo. American Indian women are highly esteemed because they give the gift of life. They typically serve as the caretakers of the family and often place the needs of family members before their own. Mutual respect between wives and husbands, between parents and children, and between family members and relatives is looked upon highly (Paniagua, 1994).

Every person in the family is viewed as a significant component of the family structure, and the family provides security and protection for people of all ages. Elders are cherished for their wisdom and knowledge. They know all the rules necessary for social order and are expected to help educate the young about tribal customs, history, and morals. Children are viewed as blessings from the creator and are included in almost every tribal activity (National Cancer Institute, 1993).

Although strong family relationships are emphasized, American Indians and Alaska Natives also foster a sense of independence among family members, particularly among children and adolescents. For example, American Indian children are rarely told directly what to do and are often encouraged to make their own decisions. Few rules are preferred among American Indians and Alaska Natives; if rules exist, they should be flexible and loosely written (Paniagua, 1994).

Native culture consists of gift offerings and sharing one's self, time, and energy with the family, clan, and tribe. The self is often secondary with respect to the role of the tribe. Like Latinos and Asians, native people reject the traditional sense of individualism because it leads to competition among family members and tribe members. Rather, they emphasize the value of collectivism and working together to achieve common goals among all members of the tribe (Paniagua, 1994). This sentiment from a Lakota woman is typical of the way native people perceive their social structure:

> *"At the core of tribal nations is not the individual but the family. Without respect for families and children, none of us will survive. We need to give people a sense of belonging. That's what makes a nation strong" (Katz, 1995).*

Concept of Time

Many American Indians and Alaska Natives treat time as a natural event and do not believe that time should control their natural way of living. Time is viewed not as a measuring tool (e.g., hours, minutes) but rather as it relates to an event or task. In the same way that material goods are often shared, many native people believe that time (to fulfill a given task) must also be shared with others. For example, punctuality is highly valued in mainstream Western culture. Lack of punctuality is viewed negatively and shows a lack of respect for other people's time. However, for native people, being late is perceived differently and can sometimes be a sign of respect for people. If someone is stopped by a person asking a question, that person takes the time to answer it. The event, then, takes priority over the clock (Paniagua, 1994).

Harmony With the Environment

Generally, American Indians and Alaska Natives have respect and reverence for the earth and all of nature, striving to live close to nature and its forces. The spiritual world includes not only humans but all living things. Many believe that each animal, tree, and manifestation of nature has its own spirit and that a universal energy links all life forms, enabling humans to communicate spiritually with other living things. Care is taken not to harm or desecrate the earth. Even today, Pueblo Indians in Taos, New Mexico, can be seen taking shoes off horses and walking in soft-soled shoes themselves in the spring because they believe that the earth is pregnant at this time of year and her body must not be harmed (Josephy, 1991).

The native concept of the world is circular; there is no beginning and no end. The motion of the sun, moon, and stars across the sky is circular as is the life path of all creatures. The "circle of life" is one of the most meaningful symbols in American Indian life. It symbolizes the continuing circle of life from birth through adolescence, adulthood, elder years, death, and then rebirth (Indian Health Service, 1995a). The importance of the circle is evident in the majority of American Indian cultures. Religious ceremonies are performed in a circle, and the shape of many traditional Indian homes is round such as the Apache wickiup, the Navajo hogan, and the tipi of the Plains Indians.

Oral Communication

American Indian and Alaska Native history is not a written history, but a spoken one. Through the art of storytelling, most tribes communicate their traditions, beliefs, and customs to younger generations. They use Indian folktales and myths to teach about religious,

social, and political system, habits and beliefs, and daily codes of conduct (Josephy, 1991). This oral communication, rich with life and meaning, is handed down through countless generations and plays a principal role in establishing the individual and collective native identity. In some native tribes, elderly as well as younger women see themselves as carriers of culture, using the wisdom of the ancients to adapt to a changing world. Paula Gunn Allen writes:

> *"My mother told me stories about cooking and childbearing; she told me stories about menstruation and pregnancy; she told me stories about gods and heroes, about fairies and elves, about goddesses and spirits; she told me stories about the land and the sky . . . She told me European stories and Laguna stories; she told me Catholic stories and Presbyterian stories; she told me city stories and country stories; she told me political stories and religious stories. She told me stories about living and stories about dying. And in all of those stories she told me who I was, who I was supposed to be, whom I came from, and who would follow me. In this way she taught me the meaning of the words she said, that all life is a circle and everything has a place within it" (Katz, 1995).*

Traditional and Contemporary Methods of Healing

American Indians and Alaska Natives have traditionally cherished good health and longevity. Harmony with nature is important to an individual's health and well-being and occurs simultaneously on physical, mental, and spiritual levels. A person in good health is considered to be in a state of beauty or harmony. In this state, all parts of the body function perfectly and feelings of well-being are felt. A person not in this state of harmony is considered either sick or ill. Sickness is a more acute state and can be physical, mental, social, or environmental in nature. Physical sickness includes colds, burns, skin rashes, and broken bones. Illness, on the other hand, is considered more serious than sickness and comes about slowly, lingers for a long time, and has no discernable cause (National Cancer Institute, 1993).

Traditionally, many tribes incorporated health and sickness concepts into their basic religious principles. Traditional beliefs defined their social origins, their relationships with the supernatural, and the nature of the universe. Tribes believed that supernatural powers assisted them in overcoming numerous environmental and social hardships. By performing mundane behaviors according to a prescribed order, they were guaranteed spiritual, social, and physical well-being. Trouble of any kind was a direct consequence of either a breach of the "prescribed order" or evil spirits causing a person's disharmony. American Indian people revered tribal healers because they believed that the healer was given special powers to control or counteract the negative powers from the human or spiritual world that caused illness (National Cancer Institute, 1993).

Many American Indians and Alaska Natives continue to have the old attitudes about health and illness, and traditional healing is still practiced by most cultures. Traditional healing is a holistic approach that involves treating the body, mind and spirit of the individual in addition to their symptoms and physical manifestations. Tribal healers use herbs and teas, as well as prayers to spirits and ritual incantations to treat their patients' symptoms. Oral communi-

cation with the spirits, or "sing" is also used to prevent sickness or illness when it is known that an individual will come into contact with objects or malignant forces (National Cancer Institute, 1993).

American Indians and Alaska Natives often incorporate both traditional healing and Western methods of healing. They have accepted the Anglo doctor's role in their healing process, but relegate the doctor to the limited role of "the treater of symptoms rather than the curer." It is understandable, therefore, why native people go to Anglo doctors primarily for symptomatic treatment with antibiotics and other quick painkillers rather than for sustained medical care (National Cancer Institute, 1993).

Community-Based Health Promotion and Disease Prevention Programs for American Indians and Alaska Natives

This section highlights some key prevention and intervention programs that have been developed to address the cardiovascular health of American Indians and Alaska Natives. These programs are not meant to depict the entirety of programs available for this population but serve only as a representative sample of existing programs.

Strong Heart Study

The Strong Heart Study, a research study sponsored by the National Heart, Lung, and Blood Institute of the National Institutes of Health, is designed to estimate mortality and morbidity from cardiovascular disease and to determine the prevalence of known and suspected cardiovascular risk factors in American Indians. This is the first study of its kind to compare levels of cardiovascular risk factors among diverse American Indian populations. The risk factors examined were high blood pressure, high blood cholesterol, diabetes, obesity, physical inactivity, smoking, and alcohol consumption. The project consisted of three components: death record reviews, medical record reviews for previous hospital and clinical visits, and physical examinations of people age 45 to 74. More than 4,500 participants from 12 tribes were examined at three sites in central Arizona, southwestern Oklahoma, and the Aberdeen area of North Dakota and South Dakota.

To accomplish this enormous task of recruiting participants, tribal councils and the Bureau of Indian Affairs were consulted regarding enumeration of the study. Significant assistance also was provided by the Indian Health Service, the National Institute of Diabetes and Digestive and Kidney Diseases, and the U.S. Army. The Strong Heart Study made every attempt to involve the participating communities. The project provided employment opportunities for American Indians in the local community to serve on the staff. Community meetings were held periodically to apprise community members of the project's status and any preliminary data collected. Community members also had an opportunity to provide valuable feedback to the investigators on the study procedures. The Strong Heart Study distributed a quarterly newsletter as another communications mechanism.

To boost recruitment efforts, evening and Saturday clinics were held to accommodate participants who were unavailable during the regular hours. At one site, exams were conducted at an apartment located within an elderly housing complex. The Strong Heart Study also participated in community events and health fairs. The project was invited to cohost the First Annual Intertribal Dialysis Association and Foundation powwow in 1991.

The Strong Heart Study received overwhelming support from community leaders and members in all three sites. Most of the prominent community members who were eligible for the project participated, thus setting an important example for other community members. Even people who were not eligible for the study

were aware of the value of the project to the community. A major reason for the success and the relatively low cost of the project was the cooperation and partnerships developed between the National Heart, Lung, and Blood Institute (the funding institute); other Government agencies; and participating tribes.

PATHWAYS

PATHWAYS is a multisite school-based obesity prevention program designed to reduce the prevalence of obesity in school-aged children by promoting healthful eating and physical activity. It is the first childhood obesity prevention study of its kind to be executed in the United States under rigorous scientific methods. Conducted in cooperation with seven reservations in Arizona, New Mexico, and South Dakota and five universities, PATHWAYS is a two-phase study consisting of a 3-year planning and development phase and a larger, full-scale study.

The classroom curriculum for grades 3, 4, and 5 teaches children the importance of healthful eating and physical activity; a school meal program and a physical activity/education program give children an opportunity to apply their knowledge; and family involvement reinforces children's health behaviors. The outcome measures for this program include children's knowledge, attitudes, and behaviors about health, nutrition, and physical activity; an assessment of their growth and development; their eating and physical activity patterns; and the nutrient content of school meals.

The first phase of the project recently has been completed and is awaiting complete data analysis before implementation of the full-scale study. Its success was based on meticulous attention paid to cultural sensitivity, accessibility to healthful food and exercise options, privacy and confidentiality of individuals, and respect for the existing school and tribal infrastructure. The project received approval from the tribal councils, universities and tribal review boards, the local Bureau of Indian Affairs, the Indian Health Service, and participating school boards before it was initiated.

Every effort was made to involve key tribal, community, and school individuals in advising the researchers on the conduct of the study and to include American Indians among research project staff. Individual and group interviews were conducted to obtain input on tailoring the program to suit the needs of the individual sites. The program components were pilot-tested, and the community had the opportunity to provide input that was then used to revise the components. The schools also participated in developing measurement methods for evaluating the effectiveness of the program. PATHWAYS is sponsored by the National Heart, Lung, and Blood Institute.

CHECKERBOARD CARDIOVASCULAR CURRICULUM

The Checkerboard Cardiovascular Curriculum was an intervention designed to increase cardiovascular health knowledge among fifth-grade children in rural New Mexico, primarily Pueblo and Navajo American Indians and Latinos. Students learned about cardiovascular health, with an emphasis on reducing high-risk behavior, by participating in 8 to 10 weekly meetings of about 2 hours. A team-teaching approach was used, and lessons were taught by a graduate student, health educators, and other health professionals. This culturally rich curriculum incorporated information on American Indian traditions about running and exercise, and the traditional American Indian and Latino diet. Children were encouraged to share stories about traditional philosophies of running and fitness and to interview grandparents about traditional Indian life. Elders also were invited to

classrooms to cook traditional, heart-healthy foods and to talk about the cultural importance of physical activity and fitness. Students were challenged to exercise at home, and all students at one school participated in a distance run. Efforts were made to adapt the curriculum to each culture. The project showed positive outcomes. Students at all schools showed a significant gain in knowledge, many students increased their exercise, and many also decreased their 1-mile walk or run time. Followup sessions revealed students' interest in continuing the program (Harris et al., 1988).

Zuni Diabetes Project

The Zuni Diabetes Project, a community-based exercise and weight control program, is designed to encourage weight loss and improve glycemic control in people with diabetes. Initiated by the Indian Health Service in July 1983, the project is now managed by the Zuni Wellness Center, a tribally owned program. The center offers weightlifting circuit training and a gym for basketball, volleyball, and aerobics classes. The center has expanded from providing 2 aerobic exercise sessions per week to offering more than 48 sessions 5 days a week in several sites in the Zuni community. Weekly clinics are held in conjunction with the exercise classes to monitor weight, serum glucose, and blood pressure. Special incentive events are also held, such as running, walking, and bicycling programs; annual weight loss competitions; and annual fitness challenges. Zuni aerobic instructors are employed and serve as role models. Participation in the program is promoted through personal invitations, recommendations from the medical staff, and a general community advertisement campaign. To increase accessibility and encourage more participation, the center also provides transportation for the community.

Traditional dancing keeps the heart strong

In 1987, the Zuni Diabetes Project, in conjunction with the Eat Right New Mexico campaign, held a weight loss competition in the Zuni and Navajo communities. Eat Right is a statewide nutrition education and weight control program implemented by the Healthnet New Mexico health promotion organization. A total of 249 people completed the 10-week program. Elements of the program included team competition, goal-setting, weekly weigh-in sessions with results posted on display boards, exercise logs, and behavior checklists.

Results from the program were extremely promising. Not only did 92 percent of the registered participants complete the 10-week program, but most people also exceeded the program's weight loss goal and managed to keep the weight off after a 50-week followup period. The participants' mean blood glucose values also dropped significantly, and they were more than two times as likely to have decreased their diabetes medication as the nonparticipants.

This study demonstrated that a community-based exercise program can be an effective way to facilitate weight loss and improve metabolic control in a group of American Indians with non-insulin-dependent diabetes mellitus. The weight loss competition proved to be an inexpensive strategy for facilitating weight loss and behavior change. It enhanced

and strengthened social support systems, which in turn stimulated interest and increased commitment among team members (Heath et al., 1991).

Southwestern Cardiovascular Curriculum

The Southwestern Cardiovascular Curriculum (SCC) is a multifactorial, culturally oriented curriculum created for American Indian students in rural northwestern New Mexico. Funded by a grant from the National Heart, Lung, and Blood Institute, the curriculum increases knowledge and promotes healthy behavior changes by teaching students lifetime skills to promote healthy habits. The curriculum focuses on physiology, nutrition, physical activity, and the effects of tobacco use. Kids also engage in skill-building activities and role-playing to teach them to resist peer pressure and other social influences. Hardiness is emphasized as an important tradition of American Indian people. As part of an intergenerational component of the curriculum, elders from the local community lead classroom discussions on the values of traditional foods and the cultural importance of both physical and spiritual well-being. Emphasis is placed on the traditional American Indian use of tobacco. School teachers and administrators are trained to teach the curriculum by attending a 2-day seminar.

Preliminary data from evaluation studies show that students experience positive changes in health knowledge, attitudes, and behavior. The curriculum helped schools meet their goals for the Healthy Kids for the Year 2000 program and the school-related objectives of the U.S. Department of Health and Human Services for educating children about nutrition, physical activity, and tobacco. The educators' training workshop increased teachers' knowledge and skills in health and multicultural education, and food service employees were given additional training in selecting and preparing healthful foods.

NIDDK Diabetes Prevention Program

The National Institute of Diabetes and Digestive and Kidney Disorders (NIDDK) has implemented a multicenter clinical study to determine if diabetes can be prevented or delayed. In preparation for this multicenter study, the NIDDK conducted a pilot study with two groups of Pima Indians who are free of diabetes and have normal glucose tolerance tests. The two groups were called Pima Action and Pima Pride. The Pima Action group members participated in discussions on healthy traditional behaviors involving nutrition and exercise and were encouraged to eat a low-fat, high-fiber diet that included beans, fruits, and vegetables. They were also prompted to exercise 3 hours a week in leisure and occupational activities and to record their activities in a journal. Most participants exercised or worked in groups when possible to maintain motivation and morale. Program staff met with study volunteers at 3-, 6-, and 12-month intervals to measure their progress.

Whereas members of the Pima Action group focused on weight loss, the Pima Pride group participants focused on discovering ancestral values and lifestyles and determining their relevance to their own lives. These participants attended presentations by community members and others to learn more about their ancestors' healthy diets and lifestyles.

Results from these pilot studies have been promising; participants are eager to make healthy lifestyle changes. Upon completion of data analysis for the pilot study, the researchers plan to develop an intervention incorporating several other treatments and the best aspects of the Pima Pride and Pima

Action programs (National Institute of Diabetes and Digestive and Kidney Disorders, 1995a).

Nutrition Assistants Program

The Indian Health Service, in collaboration with the U.S. Department of Agriculture (USDA), has developed the Nutrition Assistants Program to prepare paraprofessionals in nutrition education. These paraprofessionals are chosen from reservation communities to serve as role models and educators for other community members. Through home visits and community activities, these nutrition assistants teach people to prepare and store food in healthy ways. One week of formal training and followup training sessions are provided, which are adapted to suit the lifestyles of people living in American Indian country. College credit is offered in some sites for nutrition assistants taking the classes. The advantage of using paraprofessionals is their cultural sensitivity and their ability to relate to the target audience because they are members of the target audience.

Food Distribution Program on Indian Reservations

The Food Distribution Program on Indian Reservations (FDPIR) provides food commodities to low-income American Indian and Alaska Native families living on or near reservations. It is an alternative to the Food Stamp Program for people who do not have easy access to food stores. The program is administered by the USDA in cooperation with State agencies. The USDA provides food to the State agencies, which are responsible for food storage and distribution, eligibility certification, and nutrition education. Families receive monthly packages of basic supplemental foods such as canned meat and fish products, canned fruits and vegetables, dried beans, dairy products, grain products, fats, and sugar (U.S. Department of Agriculture, 1994).

In 1986, the USDA revised the food package by lowering the levels of fats and sugar in the food and increasing the nutrient and energy content. The agency recently launched two pilot programs to add frozen ground beef and fresh fruits and vegetables as alternatives to canned products in the food package. These products have never been available before due to the lack of transportation and storage facilities. However, the USDA partnered with the U.S. Department of Defense, an agency able to procure fresh produce and deliver it directly to tribes. In addition, a significant nutrition education component has been created that includes culturally appropriate fact sheets and recipes detailing storage, handling, and preparation of the new foods. Nutrition and cooking demonstrations are being designed and implemented by individual tribes to meet the specific needs of each area. Both pilot programs have met with huge success and are being expanded to include additional sites. The provision of these new products will allow FDPIR participants—who do not have access to inexpensive or good quality fresh fruits, vegetables, and meat—to enhance the nutritional benefits in their diet and enjoy a greater variety in their food choices (U.S. Department of Agriculture, 1993, 1996).

Wings of America

Wings of America, established in 1988, is an American Indian youth development program of the Earth Circle Foundation, Inc., based in Santa Fe, New Mexico. In partnership with American Indian communities, the program uses running as a catalyst to empower American Indian youth to identify with their heritage and take pride in themselves, leading to increased self-esteem, health, and wellness. Wings of America holds running and fitness

camps for children and adolescents. These camps teach life management and leadership skills, running and fitness techniques, substance abuse prevention, and good nutrition. The children are also taught traditional American Indian games. College-aged Wings of America runners facilitate the children's camps, and high school runners serve as peer leaders and role models.

Wings of America also sponsors teams of high school runners to the U.S.A. Track and Field National Cross Country Championship each year. The program showcases the talents of American Indian youth at this event and offers them a cross-cultural experience. To date, Wings of America runners have captured eight national junior titles since 1988 and have achieved national recognition. The program is currently developing model fitness and health programs to be implemented at the community levels through existing youth, health, wellness, school, and drug elimination programs. For example, Wings of America is working with the eight Northern Indian Pueblo Day Schools on the Gila River Reservation to supplement their health and physical fitness programs and to coordinate an all-schools track and field day. The program receives funding through the U.S. Department of Housing and Urban Development's Drug Elimination Program (Wings of America, 1996).

Recommended Strategies for Effective Programs

This section discusses some key elements to consider in designing community-based health promotion programs for American Indians and Alaska Natives. These strategies are based on findings from intervention studies on American Indians and Alaska Natives, experiences of actual programs, and expert interviews. These highlighted strategies are not displayed in priority order and do not represent the universe of successful program strategies.

1 Incorporate community culture, lifestyle, and values.

Successful interventions are tailored to the preferences and daily activities of the target population. For native people, the cultural value of family and tribe takes priority over the self; therefore, interventions that are family-centered rather than self-centered may be better accepted by the community. Activities involving participation from parents, children, grandparents, and extended family are very appealing. The special relationship between grandparents and grandchildren also can serve as an effective avenue for learning and health behavior change.

Women can be a viable channel for transmitting health messages to family members. They are often considered the educators and healers of the family. Interventions placed in the context of how behavior change will help their children and their families are more likely to be accepted because women value the preservation of the family and of generations to come. For example, a woman is more likely to exercise and to eat less fatty food so that she will be a live mentor for the family (National Heart, Lung, and Blood Institute et al., 1993).

Powwows and other tribal rituals can and should be incorporated into programs whenever possible. Powwows are one of the most visible expressions of "Indianness," and are simultaneously social gatherings, celebrations, family reunions, and occasions for spiritual renewal (Reader's Digest, 1995). Once begun as tribal celebrations, powwows have evolved into truly pan-Indian forms, blending traditions drawn from numerous tribes. American Indians from inner cities and remote reservations alike come together to celebrate their identity in song, dance, and costume. These powwows can be found nationwide. One of the biggest powwows is the Red Earth Festival held each June in Oklahoma City (Viola, 1990).

2 Gain community support.

Historically, numerous researchers have used American Indian and Alaska Native tribes to conduct their research studies without sharing the information they gained with the tribes themselves. Over time, this behavior provoked mistrust of researchers and science among native people. Suspicion and mistrust still persist today but have been somewhat remedied by researchers who have developed a working relationship with their target audience and have included community members in the intervention's planning and implementation.

The principle of participation is of utmost importance to the American Indian and Alaska Native population. When policies and priorities are developed at the national level but depend on local institutions for their execution, planners must make every effort to solicit active participation, input, and even endorsement from the tribal leaders and the community they are working with prior to collaborating on any research, training, or educational efforts.

Gaining community support is essential to sustain an effective intervention effort. Community members add credibility and visibility to the project and can provide information on the cultural values, customs, and health beliefs and practices. They also can identify key community leaders, communication networks, and local experts who might be useful to the program.

One way to organize a working group of opinion leaders is to establish a community or tribal advisory board whose members can assist in planning and implementing the program. These advisory boards typically include people who will be most affected by the intervention. These people may be tribal government leaders, elders, medicine men and medicine women, primary care providers, community health representatives, and members of the target population.

Community members should be involved in all stages of the intervention. Early community involvement in setting goals and priorities as well as in program planning provides the opportunity for ownership, which can lead to a sense of empowerment and self-determination. Community members can be enlisted to conduct their own community needs assessment, and they can serve on focus groups to provide valuable insights into the target audience's health beliefs and practices. Working groups also can help develop concepts, messages, and images to ensure cultural relevance. Native people also can work as trusted and accepted staff members who work directly with program participants. In addition, they can provide feedback to researchers about benefits to subjects from participating in interventions.

With training and support, these American Indian and Alaska Native participants can evolve into a community-based coalition that not only addresses CVD prevention but other health issues as well. Joanne Kauffman, in a forum addressing minority health issues, said:

> *"There is an awakening among Indian people about the importance of tribe, about the importance of community. Coalitions based on tribal culture can help Indian people deal with the need for 'spiritual wellness' in their communities . . . . The power of communities, the power of tribe, the power of a group, I think, can make a tremendous difference for people of color" (National Heart, Lung, and Blood Institute et al., 1993).*

3 Develop partnerships within the target community and with other Federal, State, and local organizations.

A new program implemented within the confines of existing organizations in the community can utilize established infrastructures and viable local networks to reach the target population. Partnerships with local institutions who already affect the community will strengthen the program's credibility and receptivity. Program planners must be knowledgeable of the role and impact of the health care delivery

system of the American Indian and Alaska Native community. Both the IHS and tribal governments operate service units to administer to the health needs of most American Indians, and Indian-operated urban units cater to the needs of urban Indians. However, consideration must be given to the health needs of many native people who do not receive their health care through these channels. Partnering with these and other health care organizations is key to expanding the reach of the intervention to the target population. In addition, limitations in resources, abilities, and time may be offset by cooperative arrangements with other local agencies or larger organizations at the State or national levels.

Planners also should enlist traditional medicine men and medicine women in program development and implementation in communities where they are respected and consulted. Planners should recognize existing traditional health beliefs and practices, acknowledge their potential benefits, and attempt to work with them rather than against or despite them.

Community health representatives (CHRs) have been a successful channel for disseminating health information to American Indians and Alaska Natives. CHRs are paraprofessionals who are trained as outreach workers to assist in providing health care, health promotion, and disease prevention services. The CHR program was initiated in 1968 by the IHS to improve the health conditions of many native communities. Many remote reservation tribes lacked accessibility to health care and had a low acceptance level of the modern health care system being delivered by the IHS. The CHR program bridged the geographic and cultural gap that alienated many American Indians.

CHRs are in the unique position to be more culturally sensitive to the needs of native people because they are selected from and employed in their own communities and are usually well-known, respected role models from their communities (Cleaver et al., 1989). Using CHRs in planning and implementing a program provides not only a channel to disseminate CVD information, but also a feedback mechanism to gain valuable insights about whether the program is achieving its goals.

4 Develop and disseminate culturally appropriate materials.

An accurate assessment of the target audience's CVD knowledge, their values and health beliefs, their literacy level, and their language preference is important before developing educational materials or messages. Direct community input can enhance a program's ability to design materials that address the specific needs of the target population.

Members of some tribes only speak traditional tribal languages. Therefore, consider the feasibility of developing materials in tribal languages. It is best to create materials using tribal language from the beginning. If the English-language materials are translated, only experienced translators should be used. Direct translations generally are not successful in communicating the intended message and may offend the target audience (National Heart, Lung, and Blood Institute, 1996a).

> *"All peoples and cultures relate best to and are most influenced by that which is familiar. Achieving a goal of improved health for American Indian and Alaska Native people requires the use of learning materials that are both culturally sensitive and relevant to local lifestyles." (Michael H. Trujillo, M.D., M.P.H, M.S. Assistant Surgeon General, Director, Indian Health Service).*

For American Indians and Alaska Natives, it is best to use message concepts that incorporate traditional Indian values that give cultural reinforcement and a sense of identity. Themes like "love of family," "maintaining independence," or "remaining strong" focus on the orientation of native people toward family and community and the viability of future generations. Emphasis should be on integrating traditional ways and lifestyles. For example, messages on physical activity should emphasize the Native traditions of running, dancing, and walking as a means of achieving physical and spiritual fitness. Likewise, messages to promote healthier diets should emphasize the traditional American Indian diet that is higher in complex carbohydrates and fiber and lower in sugar and fat. Messages also should have a present-time orientation because, for many native people, the present is more important than the future. Themes that focus on the future may not be as effective as those that emphasize the importance of making health behavior changes now (Paniagua, 1994; National Heart, Lung, and Blood Institute, 1996a).

When developing educational materials, it is important to assess the literacy level of the target population. For low-literacy audiences, written materials should use simple words, short sentences, and concrete concepts. Graphic illustrations maximize comprehension of key messages. One-page fact sheets and short brochures appear to be more effective than longer pamphlets for this audience. For many American Indian and Alaska Native audiences, television and videos are other effective vehicles for disseminating health messages. Television and videos can capture reflections of life and touch the viewer's heart in a way that the written word cannot. Any written or visual materials should include images of American Indians and Alaska Natives and reflections of their art and music. Generic pan-Indian pictures and symbols should be used to reflect the diversity of the Native population. In these messages, it is of utmost importance to place people in a positive context that makes them proud of their heritage.

The use of tribal elders as spokespersons in program interventions is an effective way to reach the target audience. Elders are well respected by all members of the community, especially the young. They are credible sources to teach about native traditions and to promote traditional family teachings and practices.

The channels best suited for disseminating information include powwows, Indian Health Service clinics, urban centers, reservation trading posts, grocery stores, recreational centers, and trade stores. Head Start and WIC programs and schools are avenues for reaching American Indian and Alaska Native youth (National Heart, Lung, and Blood Institute, 1987). A number of associations and networks in the radio, television, and newspaper arenas may have access to the target audiences. In addition to mass media, community volunteers, CHRs, and nutrition aides can be used to reinforce the message to the target audience. The value placed on the gift of one's time cannot be overemphasized in the native community. Interpersonal communication is a key aspect to the success of an intervention.

The health risk appraisal (HRA), used primarily in occupational settings and at health fairs, is a health survey that can be used to identify individuals in need of health education materials. An Indian-specific HRA called "Finding the Way" was developed in 1988, based on a health risk appraisal developed by the Carter Center and the Centers for Disease Control, and has been distributed throughout the Indian Health Service. This HRA can and has been

used in community and clinical settings to motivate American Indians and Alaska Natives to adopt healthier lifestyles and to take more responsibility for their health. For example, HRAs have been used extensively at health fairs to provide individuals with a profile of their health risks and recommendations for adopting healthy lifestyles. HRAs also can be administered to outpatients waiting for their appointment with their health care provider. Health educators or CHRs can assist in interpreting the survey and providing patients with appropriate health education materials. The appraisal can be filed with the patient's medical record for future reference and reinforcement by health care providers (Welty, 1988, 1989).

5 REMOVE EXISTING BARRIERS.

One of the greatest barriers to participating in health programs is lack of accessibility. American Indians and Alaska Natives in both rural and urban settings are typically underserved. At places that do have program sites, many people have no mode of transportation to the site. In some geographic locations, extreme weather conditions preclude program participation by community members. Lack of transportation or extreme weather conditions, rather than a lack of interest on the part of community members, are some of the factors responsible for some programs not reaching their target audiences.

Planners should work in cooperation with schools to make exercise facilities available for native youth. Incorporating program activities into the existing academic structure will improve the chances that these activities will be sustained long after the program funding has ended.

Another barrier that should be addressed in the American Indian community is the lack of affordable grocery stores for purchasing fresh fruits, vegetables, and meats. Programs emphasizing a return to a traditional Indian diet would likely fail to change food behaviors if traditional Indian foods are unavailable. The USDA has improved its food commodity program with the addition of fresh fruits, vegetables, and meats in some Indian communities. The agency also intends to review and make recommended changes to the food package in the near future. Coalition-building and community action is needed to influence grocery store owners on or near reservations to increase the variety of food products and to change pricing policies. Another method to circumvent this accessibility barrier is to develop communal fruit, vegetable, and herb gardens, which are shared and maintained by many community members. This option gives individuals an opportunity not only to be physically active, but also to commune with nature and share the fruits of their labors with other community members.

Theoretical Models

Theoretical models provide a necessary framework from which to develop effective health promotion programs. Because not all models can comprehensively address the specific needs of the intended program, a combination of models is often used. This section briefly discusses aspects of five models that can be incorporated into the development of health promotion programs targeting American Indians and Alaska Natives.

PRECEDE Model

Green and Kreuter's PRECEDE Model (1991) uses a multidimensional approach to address behavioral and environmental factors that influence health behavior. The PRECEDE Model groups behavioral and environmental factors into three broad categories: predisposing, enabling, and reinforcing factors.

Predisposing factors are the knowledge, cultural beliefs, values, and perceived abilities of an individual or group that facilitate or hinder motivation for change. A heightened awareness of one's cardiovascular risk may be the first step in influencing one's health behavior. This knowledge, accompanied by sufficient motivation, is an essential factor in changing individual or collective behavior. Understanding the target audience's level of knowledge about cardiovascular disease and its risk factors, their attitude toward engaging in health-promoting behaviors, and the beliefs and values they place on health and disease is fundamental to developing a culturally relevant and appropriate program.

Enabling factors are environmental conditions that enhance or hinder desired behavioral changes. These factors are usually the targets of community organization and program intervention. A group's health behaviors are dependent on the availability, accessibility, and affordability of the product causing the health problem. Similarly, their ability to adopt new health behaviors is limited to the degree to which health resources are available, accessible, and affordable. This issue is especially pertinent in programs targeting American Indians and Alaska Natives living on reservations and in villages. The remoteness of health care facilities, lack of transportation, and extreme weather conditions are environmental enabling factors that affect the availability and hinder accessibility to health care services. People in urban areas also suffer from lack of necessary clinical preventive services.

The Food Distribution Program on Indian Reservations (FDPIR) is an example of an enabling factor that affects the dietary behaviors of American Indians and Alaska Natives. The FDPIR was established by the U.S. Department of Agriculture (USDA) in 1977 to provide supplemental food commodities to low-income native families living on or near reservations. Families receive monthly packages of canned fruits and vegetables, canned meat and fish products, dried beans, dairy products, grain products, fats, and sugar. A 1990 evaluation of the FDPIR showed that approximately 65 to 70 percent of American Indians and Alaska Natives living on reserva-

tions received either food commodities or food stamps. However, participation in the FDPIR program does not guarantee nutrient-dense foods or a variety of foods, however. This program is designed as a supplemental food source, and recipients are expected to purchase a portion of their monthly food supply. Unfortunately, for many families, limited access to grocery stores, minimal food choices in available stores, and lack of refrigeration result in complete dependence on commodity foods (National Cancer Institute, 1993).

The ability to perform new skills is also an enabling factor needed to change a health behavior. These skills may include the ability to measure one's blood pressure or to perform appropriate physical exercises. An assessment of the target audience's skills can give planners valuable insight into possible program components.

Reinforcing factors include the positive and negative feedback people obtain from others following the adoption of the behavior. These factors include family and social support, peer influence, and real or perceived positive or negative consequences of the behavior.

Social benefits (e.g., praise, recognition) and physical benefits (e.g., comfort, relief from pain) are factors that reinforce behavior. Reinforcing factors also include adverse consequences of behavior, or punishment, which can lead to the extinction of a positive behavior. Incorporating activities in a program that reinforce positive health behaviors will more likely lead to permanent behavior change. It is important to determine what the target community values. For example, many native people are very family-oriented and highly value elders and children. Family-oriented programs that involve the participation of some or all family members in changing behavior may be more successful than programs that focus on the individual.

Health Belief Model

The Health Belief Model attempts to explain health behavior in terms of specific belief patterns (Green and Kreuter, 1991). The model is based on the following assumptions about behavior change.

- The person must believe that he or she is susceptible to disease and that his or her health is in jeopardy.
- The person must perceive the potential seriousness of the condition (i.e., pain or discomfort, lost productivity, economic constraints).
- The person must believe that the benefits of changing his or her behavior outweigh the barriers. The person also must believe that the change is possible and within his or her grasp.
- There must be a precipitating force that compels the person to feel the need to take action.

Social Learning Theory

The Social Learning Theory explains human behavior in terms of a reciprocal interaction among cognitive, behavioral, and environmental determinants (Bandura, 1977). It suggests that people not only react to external influences but also proactively create and regulate their own environment. People learn through direct experience, through vicarious experience by observing others, and through their cognitive ability to plan goals, anticipate consequences, and assess their own capabilities. The cognitive process of appraising one's own ability to perform a behavior successfully is called self-efficacy. Self-efficacy is an important factor in determining whether behavior change takes place. Self-efficacy explains how people set standards for themselves in changing their behaviors and how mental barriers

can hinder their ability to change. Planners should consider activities that foster self-efficacy in individuals when developing health promotion programs. For example, programs can include setting goals for behavior change in small increments so that participants are more likely to succeed in their new behaviors.

Theory of Reasoned Action

Lewin's Theory of Reasoned Action holds that the final step in the predisposing process before actual action takes place is formulating a behavioral intention (Green and Kreuter, 1991). A person's intention to perform a behavior depends on three things: (1) his or her attitudes toward the behavior, (2) his or her perception of social norms favoring the behavior, and (3) his or her motivation to comply with these social norms. To change a person's behavioral intention and thus their actual behavior, one must change one or all of the attitudinal, normative, or motivation-to-comply factors.

Stages of Change Model

People do not change chronic behaviors immediately, but instead change their habitual behavior over time. In Prochaska and DiClemente's Stages of Change Model, people are categorized into four stages of behavior change (Prochaska et al., 1994). The first stage, precontemplation, is a condition in which people have not thought of or are not interested in change. In the second stage, contemplation, people give serious thought to changing behavior. Action, the third stage, is the 6-month period after an overt effort to change has been made. Finally, maintenance is the period from 6 months after a behavior change until the behavioral problem in question is completely terminated.

This model is especially relevant for program planners and educators using information diffusion strategies because it sensitizes them to the notion that different change strategies are required depending on the stage of change people are in. For example, people in the precontemplation stage may need information to increase their knowledge of cardiovascular risk factors. People in the action phase, on the other hand, may need specific strategies that focus on changing behaviors.

Needs and Opportunities

This section offers recommendations for transforming needs into opportunities regarding health promotion and disease prevention and control programs targeting American Indians and Alaska Natives. These recommendations are based on the existing epidemiological literature, on evaluations of current health promotion and disease prevention programs, and on telephone interviews with people working to improve the health of native people. The recommendations are divided into four phases: design and assessment, planning, implementation, and evaluation. These recommendations are by no means exhaustive, but they do provide a framework upon which to build effective health programs that change attitudes, increase knowledge, and adapt lifestyle behaviors relative to heart health among native people.

Design and Assessment Phase

There is a paucity of data on the health status of American Indians and Alaska Natives. These data are necessary to develop, implement, and assess effective CVD programs. Significant effort should be placed on improving the representation of native people in national health surveys. More studies similar to the Strong Heart Study, which compares groups of American Indians, are desperately needed to determine the extent of variability in the health behaviors and disease patterns of different tribes.

An American Indian and Alaska Native task force or advisory board should be established in the community prior to the development of any health programs. The advisory board may consist of representatives of Federal agencies, professional organizations and nonprofit advocacy groups, tribal leaders, medicine men and medicine women, and interested community members. A wide representation will add credibility and visibility to the project. Members of the advisory board can provide information on cultural values and health beliefs and practices. They also can identify key community leaders, local experts, and organizations that might be useful to the program.

A needs assessment survey should be developed to identify the educational gaps in existing CVD programs targeting American Indians and Alaska Natives. Telephone or in-person interviews with community leaders, native health officials, and tribal elders, as well as focus groups, will provide a clearer picture of the community's perceived needs. The multifactorial nature of CVD and the diversity of the native population preclude the development of an all-encompassing program targeting all American Indians and Alaska Natives and all cardiovascular risk factors. On the other hand, a more feasible program would focus on specific risk factors and target specific segments of the population. Another option would be to create a health promotion program that emphasizes lifestyle changes and behavioral modifications in areas that crosscut all cardiovascular risk factors. The advantage of focusing on lifestyle change is that it acknowl-

edges the fact that behavior is a complex pattern of interrelated practices that are socially conditioned and culturally embedded. These behaviors, such as smoking and consumption of high-fat foods, may act synergistically to produce poor health outcomes. A holistic health promotion approach that takes into account the social norms, cultural values, and environmental circumstances that affect behavior may be particularly appropriate to native people who are accustomed to holistic methods of healing.

Based on the epidemiological data presented in this background paper, the following cardiovascular risk factors and target audiences are identified as possible priority interventions:

- cigarette smoking in tribes living in the Midwestern United States and in Alaska;
- cigarette smoking among youth living on reservations;
- diabetes in all tribes, especially those in the Southwestern and Midwestern United States;
- high blood pressure in tribes with a high prevalence of diabetes;
- obesity and physical inactivity in all tribes, with emphasis on family interventions and childhood obesity prevention programs; and
- comprehensive health promotion approaches incorporating heart-healthy lifestyle changes.

Planning Phase

A network of organizations with access to the target audience can be one of the most effective methods of reaching the greatest number of people. When developing a CVD intervention program, potential partners should be invited to serve on an information diffusion and outreach network that promotes heart health among American Indians and Alaska Natives. This communication infrastructure can be a channel to disseminate, monitor, and evaluate heart health information distributed to native groups and individuals. Federal agencies, professional associations, and nonprofit advocacy groups can serve as potential partners. Examples include:

- Indian Health Service,
- U.S. Department of Agriculture,
- National Indian Health Board,
- National Congress of American Indians,
- Association of American Indian Physicians, and
- American Indian Health Care Association.

There is a dearth of CVD educational materials for American Indians and Alaska Natives. Many community health clinics and community-based programs rely on outdated, scientifically inaccurate, culturally irrelevant materials. Educational materials that are accurate and have been pretested for cultural sensitivity and literacy level are desperately needed.

- Focus groups should be used to develop message themes and concepts.
- Contractors, producers, and artists from the native community should be used.
- Educational materials should be generic enough to be culturally relevant to most American Indian tribes. Original layout and master copies of the material should be made easily available so that organizations can adapt them to suit specific target audiences.
- Educational materials should be pretested in different sites, including health fairs, Indian Health Service clinics, powwows, and annual conferences of professional associations.

An effective media campaign should be used to launch a health education program and to increase its visibility. Information from focus groups can help determine message concepts and target audiences for dissemination. American Indian and Alaska Native contractors with technical expertise in creating media suitable for the target audience should be used in program development and identification of media placement in native communities. In addition, media-related associations with interest in promoting issues of this population can be involved in publishing or broadcasting information about the program. Some of these associations include:

- American Indian Library Association,
- Native American Journalist Association, and
- Native American Public Broadcasting Consortium.

Implementation Phase

To build and maintain interest in the health intervention, community members should participate actively in all aspects of the program, including the implementation phase. Traditional healers, community health representatives, nutrition aides, students pursuing allied health fields at American Indian colleges, and other interested groups or individuals can be recruited as either staff members or volunteers. School boards, health boards, and community youth programs can be channels for incorporating family activities and community events such as powwows and sporting events into the program.

A series of professional education training programs may be developed for interested health professionals and paraprofessionals. These programs should incorporate both Western and traditional medicine in the areas of cardiovascular health for American Indians and Alaska Natives. This "train-the-trainer" educational method is particularly effective in promoting health behavior among members of the target audience long after the intervention has ended. In addition, many native people view health professionals and paraprofessionals as role models in their communities.

Annual conferences of native professional associations and other health-related associations are another channel for disseminating educational information and recruiting potential partners. Poster sessions and plenary sessions can help raise awareness about CVD and provide an occasion to present research training opportunities to American Indians and Alaska Natives. Some annual conferences include:

- National Congress of American Indians,
- Association of American Indian Physicians,
- American Indian Science and Engineering Organization, and
- American Indian Health Care Association.

Evaluation Phase

A system should be devised to monitor information diffusion and education efforts. The tracking system should provide both quantitative and qualitative data on process, impact, and outcome measures. The advisory committee and other members of the community should be actively involved in designing the evaluation methodology and identifying process, impact, and outcome measures.

Conclusion

As a minority population in the United States, American Indians and Alaska Natives have not fully shared in the dramatic reductions in cardiovascular disease and other diseases experienced in recent years by the general population. CVD continues to take thousands of Native lives each year, destroying the strength and viability of native communities throughout the Nation.

Fortunately, health promotion and disease prevention programs are now being implemented at the community level to counteract these destructive forces and address the cardiovascular needs of American Indians and Alaska Natives. These interventions range from teaching young children to live healthy and active lifestyles to changing the health behaviors of people already affected by CVD or complications from cardiovascular risk factors. However, much more needs to be accomplished to reduce the disproportionate burden of disease among native people and to improve the health and well-being of this generation and generations to come.

According to a Sioux prophecy, the seventh generation since the colonization of American Indian land by European settlers marks the time that the Nation's broken hoop will be mended and American Indians will once again live in peace, health, and harmony. The American Indians of today are the seventh generation that their ancestors prayed for (Katz, 1995). Therefore, it is appropriate and necessary that health promotion programs be created to mend the broken hoop of health and longevity that American Indians and Alaska Natives once enjoyed.

This poster is entitled "Keepers of Wisdom to Strengthen the Hearts: American Indians and Alaska Natives" created by Sam English

Resources

NHLBI National Education Programs Offer Leadership and Information

Since 1972, the NHLBI has taken steps to apply the latest research to the development of practical methods to promote successful health interventions. Through its national education programs and initiatives, the NHLBI plays a leadership role by educating health care professionals, patients, and the public about the prevention and treatment of heart, lung, and blood diseases and sleep disorders. The national programs develop and distribute patient and professional materials, including clinical practice guidelines, and sponsor special events such as the **National High Blood Pressure Education Month (May)** and the **National Cholesterol Education Month (September)**, which promote awareness of heart disease risk factors and encourage regular screening.

Visit the NHLBI Web site at http://www.nhlbi.nih.gov for more information about the programs and initiatives listed below or to access publications in electronic format.

- **Cardiovascular Information**
  - National High Blood Pressure Education Program
  - National Cholesterol Education Program
  - National Heart Attack Alert Program
  - NHLBI Obesity Education Initiative
- **Sleep Disorders Information**
  - Sleep Disorders Activities
- **Lung Information**
  - National Asthma Education and Prevention Program

You can also contact the NHLBI Information Center to request information about any NHLBI-sponsored program or initiative or to request a publications catalog:

NHLBI Information Center
P.O. Box 30105
Bethesda, MD 20824-0105
Telephone: (301) 251-1222

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